

THE³ COMMERCIAL CAR JOURNAL

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa.



The performance of this truck led to the sale of thirty other Peerless Trucks to the Standard Oil Company. It is covering a daily route of sixty-five miles in Memphis and vicinity.

THE Standard Oil Company ordered its first Peerless Truck in March, 1911. The efficiency of that truck in actual service brought many repeat orders, beginning six months later—seven trucks in September; two in October; three in November; and eighteen in January, 1912—thirty-one Peerless Motor Trucks in all.

Peerless
3-Ton
4-Ton
5-Ton
MOTOR TRUCKS

Peerless performance is due to correct design, sterling materials and master workmanship. Every part of the Peerless Truck is made exclusively for trucking service, in one of the most highly organized factories in America. We invite correspondence.

TRUCK DEPARTMENT
THE PEERLESS MOTOR CAR CO.
CLEVELAND

TL1
.257

HIGH SPEED NON-GRAN BEARING BRONZE

"Will not metallize the oil"

What is going on inside of your motor?

In an automobile motor the oil that passes through and lubricates any one bearing, is the same that passes through and lubricates all the other bearings and all the other moving parts.

Can you not see, then, that if any one bearing is of a granular, loose-knit structure, which is flaking off under frictional stress, the oil passing through it will collect these metallic flakings and carry them to every other bearing and moving part in the motor and cause their rapid wear?

That is why the granular bronzes are rapidly being given up in automobile work and why NON-GRAN has now been exclusively adopted for all minor shaft bearings by that large class of manufacturers who have learned the wisdom of keeping their trucks out of repair shops.

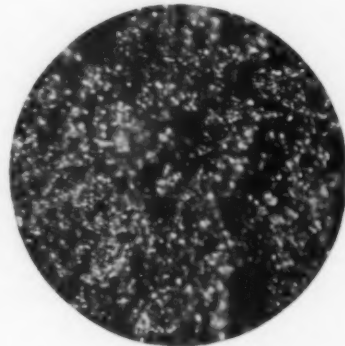
These microscopic-photos show *why* the granular bronzes flake off and metallize the oil, and *why* NON-GRAN bronze can *not* flake off and can *not* metallize the oil.

In selecting your new truck, or in repairs to your present truck, insist upon getting NON-GRAN Bronze in all of the minor shaft bearings.

Nearly 1200 Garages and Repair Shops are now making all their bearings, for replacement work, from NON-GRAN Cored-Bars. NON-GRAN Bars are stocked in every important city in the country by the leading Jobbing and Wholesale Hardware Houses. There is, therefore, no reason why you need tolerate granular bronze and metallized oil.



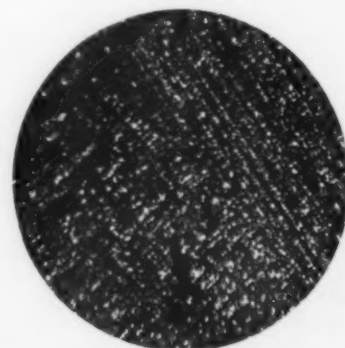
Our booklet D is a non-technical treatise on this whole subject. It is of dollars and cents value to every truck owner—shall we send you a copy?



Granular Bronze

Enlarged from a section smaller than the head of a pin.

The white spots are the individual particles of which the bronze is made up, and between which, as you can readily see, there is practically no bond or connection. Result,—these particles are easily ground off under frictional stress and immediately saturate the oil.



NON-GRAN BRONZE

Enlarged from a section smaller than the head of a pin.

Note the bonding fibres which hold together every particle of NON-GRAN Bronze. These fibres—billions in number, which in actual size are far too minute to be seen—branch out in every conceivable direction and are locked and interlocked into each other that they form a cohesive mass which frictional pull cannot disturb. Result,—the bearing itself lasts many times longer, and the oil leaves it as clean as it enters it.

American Bronze Company, Berwyn, Pa.

THE PUBLISHERS' PERSONAL PAGE

"IGNORANCE DOUBLES TROUBLE"

Shortsightedness of Some Commercial Car Users

The average truck user, as a rule, has in mind the purchase of commercial cars anywhere from six months to two years before he actually makes an investment. During this time almost any of them will admit that they know very little about the subject, but will tell you that they are going to look into it and intend purchasing a machine later on. If one takes the trouble to study into their methods of "looking into it," it will, as a rule, be found that occasionally, if they happen to be passing a commercial car show room, they may stop in without making themselves known and look over a car, ask a few questions and go out. They are actually afraid someone might send them a catalog or follow them up before they are ready.

Not Ready Yet

Very few of these men are receiving regularly any of the trade papers or other literature on the subject, and if asked to subscribe to such publications would probably say, "Oh, I am not ready yet. I haven't any machines and don't

expect to have any for several months or a year. It will be time enough to read up on the matter after we get some trucks in service."

They Do Not Realize

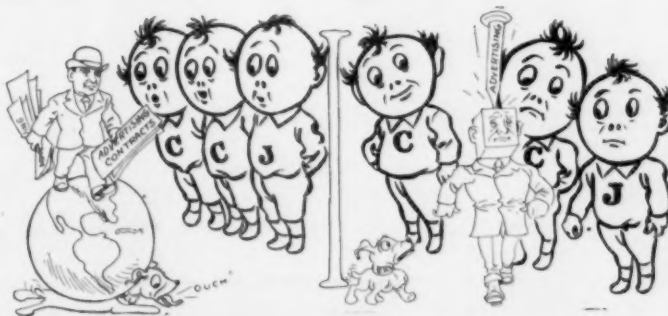
Others will be found who have already purchased a machine and of course for a short time it runs beautifully, and they feel that their troubles are over and they have no need for trade papers or other literature on the subject. They apparently do not realize, or overlook the fact, that their troubles are only beginning, and that through ignorance their troubles are likely to be doubled.

A Campaign of Education

Here is a campaign of education that must be waged by the car makers and their selling organizations. The trade papers are doing their best to educate and to bring to a high state of perfection the user. If, however, the Manufacturer and the agent do not heartily support and second the trade papers by recommending them to their prospective customers, the ultimate good which might be done will be greatly lessened. We feel, as publishers, that every maker, every individual of the selling organization, should make it their personal business to further the reading of all trade literature wherever within their power.

Table of Contents

	PAGE
Among the Manufacturers.....	6
Boston Commercial Motor Vehicle Show.....	11
Care of a Motor Truck, The.....	45
Editorials.....	9
Importance of Trailers and Road Trains.....	23
Impressions of European Manufacturing and Operating Methods.....	30
Information Bureau.....	42
Mechanical Perfection and Imperfection as Seen at the Shows— In Part a Criticism.....	33
Mercury Air-Cooled Commercial Cars.....	14
Milk Dealer Uses Mixed Service of Gasoline and Electric Cars Successfully.....	48
Motor Truck Which Actually Supplants the Railroad as a Hauler of Freight, A.....	28
N. A. A. M. Calls Meeting of Motor Truck Makers.....	3
New Commercial Cars.....	14
News of the Dealers and Garages.....	41
Stegeman Long Wheel Base Commercial Cars.....	17
Stephenson Double Friction-Drive Commercial Cars.....	20
Talks With Users.....	43
Trackless Locomotive, A.....	32
Trailers and Commercial Cars in Europe. By Our Foreign Correspondent.....	51
Truck Accessories and Appliances.....	37



*The man who knows is the man who goes
Through the world acclaimed as wise.
While he who's dense and lacks good sense
Will never advertise.*

The Autocar



Start Your Automobile Service Right

The most important step in organizing an efficient motor delivery service is in selecting the right car. Autocars now being "used in every line of business", have demonstrated by efficient daily service, their reputation of being the best light delivery car on the American Market today.

The leading concerns of the country are using them profitably and economically in their business.

We will mail list of Autocar owners, and our Commercial Car Catalogue No. 4-C

The Autocar Company, ARDMORE, PA.
Established 1897

Sales and Service Buildings

PHILADELPHIA NEW YORK BOSTON
23rd and Market Streets 428-430 } W. 19th Street Beacon Street and Commonwealth Ave.
435-437 }

**Continuous Efficiency
Guaranteed**

The Commercial Car Journal

VOLUME III

PHILADELPHIA, MARCH 15, 1912

NUMBER 1

N. A. A. M. Calls Meeting of Motor Truck Makers

Scale of Weights and Speeds Adopted. Next Year's Shows, New York, Jan. 11 to 25—Chicago, Feb. 1 to 15—Second Week of Each, Commercial Cars, as Before

About forty representatives of commercial motor car manufacturers held a meeting in New York on March 4th and 5th, at the headquarters of the National Association of Automobile Manufacturers, No. 7 E. 42nd Street, in accordance with a call issued by the commercial car committee of the association.

The principal objects of the meeting were to promote better acquaintance among the manufacturers, to discuss trade conditions and to recommend action by the National Association looking toward greater uniformity in construction, ratings, warranty and selling methods.

Pronounced interest in all questions taken up for discussion was evident and the results of this first general meeting of the trade are most gratifying to the committee.

After a short address of welcome by Pres. W. E. Metzger, of the N. A. A. M., and a brief talk on trade conditions by Chas. Clifton, the meeting was called to order by A. D. Waldon. Following discussions on the different topics, the meetings adopted resolutions recommending adoption by the N. A. A. M. of uniform maximum speed ratings with load for motor trucks, of different load capacities and uniform weight allowance for the simplest form of body regularly catalogued, as given in the accompanying table.

Weight of Bodies and Speed Limits for Various Sizes of Commercial Cars Recommended by the N. A. A. M.

Tons	Pounds	Miles Per Hour	Weight Std. Body	Weight Ld. & Std. Body.
1/2	1000	16	500	1500
1	2000	15	600	2600
1 1/2	3000	14	700	3700
2	4000	13	800	4800
2 1/2	5000	12	900	5900
3	6000	11	1000	7000
3 1/2	7000	10 1/2	1100	8100
4	8000	10	1200	9200
4 1/2	9000	9 1/2	1300	10300
5	10000	9	1400	11400
6	12000	8	1600	13600
7	14000	7	1800	15800
8	16000	6	2000	18000
9	18000	5 1/2	2200	20200
10	20000	5	2400	22400

The question of a standard allowance for occasional overload was given much attention and it was resolved that "in the opinion of the meeting it is inadvisable to encourage the belief that a truck is designed to carry any weight in excess of its rated capacity, or to permit a warranty to apply to any truck which is overloaded." The meeting recommended the preparation of a standard plate for the chassis on which should be stamped the rated capacity of the machine and some such admonition as "Do not overload."

There was considerable discussion regarding the abuse of demonstrations and the advisability of making charges by the day for demonstrations, the rate of charge to be based upon the capacity of the trucks. It was the consensus of opinion that such charges should be made, the payments therefor to be refunded upon purchase of the machine. No scale of charges was decided upon.

The desirability of a standard form of warranty was generally agreed upon, and after exhaustive discussion of the subject the following form was recommended to the executive committee of the N. A. A. M. for adoption:

Standard Motor Truck Warranty

"We warrant the new motor trucks manufactured by us for ninety days after the date of delivery to purchaser, this warranty being limited to the furnishing, in our factory, of such part or parts of the motor truck as shall, under normal use and service, appear to us to be defective in material or workmanship.

This warranty is limited to the shipment to the purchaser without charge, except for transportation, of the part or parts intended to replace the part or parts which, upon their return to us, at our factory, for inspection, we shall have determined were defective, and provided the transportation charges for the part or parts so returned have been prepaid; and provided further that the said failure of said part or parts is shown not to be due to abnormal use, misuse, neglect or accident, occurring after such motor truck shall have been shipped to the purchaser.

We make no warranty whatever in respect to tires, rims, ignition apparatus, lamps, gas tanks, signalling device, generators, or other trade accessories, inasmuch as the same are usually warranted separately by their respective manufacturers.

The condition of this warranty is such that, if the motor truck to which it applies, is altered or repaired outside our factory, or if it is operated at a speed in excess of its factory-rated speed, or if it is loaded beyond its factory-rated load capacity, then this warranty shall become null and void and our liability under it shall cease.

The number of the motor truck to which this warranty shall apply isand is described as

S. A. E. Truck Wheel and Band Dimensions Adopted

With the object of securing greater uniformity of dimensions in motor truck wheels and bands, it was resolved to recommend that the dimensional tolerances of felloe bands recommended by a technical committee of the Society of Automobile Engineers, after a careful investigation, be adopted by the N. A. A. M. These tolerances are given in a report of the S. A. E. technical committee for February, 1912, as follows:

1. Tolerance in circumference of felloe band shall be as follows:

	Plus.	Minus.
Before application to wheel	1-32 in.	1-32 in.
After application to wheel	1-16 in.	1-32 in.

Variation from precise measurements shall be uniform over entire width of band.

(This modifies our recommendation in report accepted at the June, 1911, meeting of the Society, to meet the requirements of the more extensive manufacture of rigid base tires)..

2. Tolerance in width of felloe band:

	Plus.	Minus.
Up to and including 4 in.	1-32 in.	1-32 in.
4 1-16 in. to 6 in.	3-64 in.	3-64 in.
6 1-16 in. to 12 in.	1-16 in.	1-16 in.

3. Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1-32 in. up to and including 6 in. width. Over 6 in. width within 1-16 in.

4. Variation in thickness of band: .006 in. plus or minus.

5. Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1-16 in. plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

Resolutions were also passed recommending that the commercial vehicle committee continue work in the direction of securing data on the width and length of chassis frames back of the seat with a view to possible future standardization of bodies for interchangeability on trucks of the same capacity; also toward securing data as to wheel diameters, height of frame or platform from the ground and corresponding heights of railroad cars and loading platforms.

The meeting adjourned to reconvene upon call on June 4 next, and on November 7.

Representatives In Attendance

Messrs. S. D. Waldon, Packard Motor Car Co. (Presiding).
 W. E. Metzger, Metzger Motor Car Co. and Everitt M. C. Co.
 Chas. Clifton, Pierce-Arrow Motor Car Co.
 Benjamin Briscoe, United States Motor Co.
 B. A. Gramm, Gramm Motor Truck Co.
 F. I. Harding, Peerless Motor Car Co.
 H. Kerr Thomas, Pierce-Arrow Motor Car Co.
 G. J. Loomis, Speedwell Motor Car Co.
 Vincent Link, Universal Motor Truck Co.
 M. T. Pilcher, Federal Motor Truck Co.
 Albert L. Pope, Pope Mfg. Co.
 W. C. Walker, Pope Mfg. Co.
 C. E. Stone, Gramm Motor Truck Co.

P. K. Hexter, Gramm Motor Truck Co.
 A. M. Chase, Chase Motor Truck Co.
 E. O. Sutton, Knox Automobile Co.
 A. W. Robinson, Locomobile Co. of America.
 A. J. Doty, The Lansden Co.
 Will H. Brown, Mais Motor Truck Co.
 Walter C. White, The White Co.
 H. F. Flowers, American Locomotive Co.
 Peter Dumont, Baker Motor Vehicle Co.
 H. S. Diller, Lauth-Juergens Motor Car Co.
 Morris Grabowsky, Alden Sampson Mfg. Co.
 H. S. Stebbins, General Motors Truck Co.
 C. H. Wallerich, General Industrial & Mfg. Co.
 Herbert G. Streat, Knickerbocker Motor Truck Mfg. Co.
 F. F. Lewis, Knickerbocker Motor Truck Mfg. Co.
 J. T. Langhorne, Packard Motor Car Co.
 E. W. Curtis, Jr., General Vehicle Co.
 Wm. P. Kennedy, American Locomotive Co. and Baker Motor Vehicle Co.
 F. Nelson Carle, General Vehicle Co.
 Alfred Reeves, United States Motor Co.
 S. V. Norton, B. F. Goodrich Co.
 C. W. Fletcher, Walter Motor Truck Co.
 G. A. Hodges, International Motor Co.
 David S. Ludlum, The Autocar Co.
 George H. Kelly, Baker Motor Vehicle Co.
 H. E. Coffin, Hudson Motor Car Co.
 R. D. Chapin, Hudson Motor Car Co.

Following the meeting of the Commercial Car members the regular meeting of the N. A. A. M. was held and the recommendations of the commercial meeting were adopted, except as to the form of warranty, on which it was considered necessary to take some further legal advice, and which was, therefore, referred back to the proper committee for that purpose.

It was decided that the national shows of next season shall be held at New York, commencing January 11th and at Chicago February 1 to 15, the first week being devoted to pleasure and the second to commercial vehicles, as heretofore.

A committee was appointed to confer with a committee of the Automobile Board of Trade, formerly the Association of Licensed Automobile Manufacturers, as to a plan for the combination of the two associations.

The Commercial Vehicle Committee of the N. A. A. M. for the ensuing year was elected as follows: S. D. Waldon, chairman; W. C. White, B. A. Gramm, Fred White.

Endeavoring to Limit the Weight of Trucks, Size of Tires and Speed on Public Roads

The State Highway Commission of Massachusetts has been endeavoring to have a law passed limiting the maximum weight of any vehicle that could use the public road to six tons, including the vehicle and load, and the maximum speed to eight miles an hour, and the weight carried by each wheel to 800 lbs. to an inch width of tire. Because of considerable opposition on the part of Boston teamsters and users of commercial cars, the commission has changed their limits to 12 tons, including vehicle and load, 15 miles an hour for light wagons and 12 miles for heavy trucks, but has not changed the amount of load to the width of the tires. The legislative committee has not yet acted upon the bill, and it is thought that owing to the strenuous opposition of the users of the highways, that it will more nearly meet actual conditions when it is finally passed. Some of the trucks in daily use in Boston carry as much as 2600 lbs. to inch width of tire.

NEW YORK COMMERCIAL CAR PARADE APRIL 13TH

The Motor Truck Club, N. Y. City, has decided on Saturday, April 13th, as the date for its 1912 annual commercial car parade. It is estimated that there are fully 9000 motor trucks in use in New York at this time, and it is expected that fully twice as many trucks will participate in the parade as took part last year.

INDIANAPOLIS SHOW UNDER TENT

Indianapolis, Ind., will have its show this year March 25 to 30, under a tent, as there was no hall available in the city large enough for the automobile show. The dealers have been granted the privilege of the use of University Park, in the heart of the city, for two weeks, by the city authorities. They will erect a large tent, which will be lighted by electricity, the light being donated by the local electric lighting company. The show should be a rousing success, as the entire town is co-operating with the dealers.

S. A. E. ESTABLISHES NEW FORM OF MEMBERSHIP

By constitutional amendment a new form of membership has been created in the Society of Automobile Engineers. This is the affiliate grade of membership, and firms or corporations engaged in the manufacture of automobile vehicles or the manufacture of parts or accessories used in connection therewith are eligible to it. Affiliate members have the right, subject to the approval of the Council of the Society, to designate personal representatives up to a total of six.

The affiliate membership was established in answer to a distinct demand. Frequently firms want their employees to have the benefit of the proceedings of the Society. Many of these employees are more or less fleeting; they are one time with one firm, then with another. Under the new form of affiliate membership, firms can secure the advantages of knowledge their employees get through contact with S. A. E. members, attendance at meetings, readings of papers and reports, and participating in discussion.

The Contest Board of the Chicago Motor Club has decided that the four days' commercial vehicle test which is to take place in May next will consist of a two-day run to Rockford, Ill., by the way of Elgin and return, stopping over night at Rockford, a total of about 180 miles, a one-day run on the third day to Joliet and back, which is 80 miles for the round trip and a run through the city on the 4th day, taking in the downtown district.

The statement recently made to the effect that drivers of commercial motor cars, owned by industrial establishments in the State of Pennsylvania, need not have special drivers' licenses, is branded as false by the State Highway Commissioner, who has issued a ruling to the effect that every person operating a car, with the exception of the owners of the car, must have a driver's license. This includes all industrial establishments as well as other owners of motor cars.

The commercial car owner should become a regular reader of the COMMERCIAL CAR JOURNAL, so that he may be well informed as to the new improvements and appliances that are constantly being brought out to increase the efficiency of commercial cars.

PERSONAL MENTION

JAS. A. HARRIS, JR., of the sales department of the White Company, has been made advertising manager.

J. T. GFRORER is in charge of the service department of the American Locomotive Company, Providence, R. I.

L. B. GARRISON, formerly with the Peerless Motor Car Company, is now manager of the motor truck division of the Speedwell Motor Car Company's Chicago branch.

C. A. EMISE, of the Lozier Motor Company, Detroit, Mich., has been promoted to the position of sales manager. James T. Evans succeeds him as advertising manager.

E. LEROY PELLETIER, formerly advertising manager of the Studebaker Corporation, has become advertising manager for the Universal Motor Car Company, of Detroit, Mich.

GLEESON MURPHY has recently been made vice-president of the General Motors Truck Company, and is also assistant to President Neal, of the General Motors Company (proper).

RAYMOND STEPHENS has been appointed General Sales Manager of the Dart Manufacturing Company, of Waterloo, Ia. Stephens has been identified with the automobile industry for the past six years.

F. H. STEWART, formerly with the Badger Motor Car Company, is now sales manager for the Monitor Automobile Works, Janesville, Wis. His headquarters will be at the Monitor General Sales office in Chicago, Ill.

V. M. PALMER, formerly superintendent and chief engineer for the Selden Motor Vehicle Company, of Rochester, N. Y., and recently chief engineer and manager of the automobile department of the Sheldon Axle Company, Wilkes-Barre, Pa., has resigned this position to go with the B. F. Board Motor Truck Company, of Alexandria, Va., as factory manager and chief engineer.

CHAS. LEWIS, president of the Lewis Spring & Axle Company, Jackson, Mich., died suddenly on February 24th. Mr. Lewis was 59 years of age, and was interested in other enterprises, among them the E. C. Clark Motor Company, of Jackson. He had an enviable reputation as a fair and unselfish man. Practically the entire city of Jackson attended Mr. Lewis' funeral. Mr. Lewis leaves a widow, three daughters and one son. The latter is Fred H. Lewis, treasurer and general manager of the Lewis Spring & Axle Company.

Suit has been brought against the Bellamore Armored Car & Equipment Company, Bridgeport, Conn., by George C. Miller, to require it to deed back the property of the Bridgeport Vehicle Company, of which Miller is a stockholder. He also asks for \$7500 damages. He charges that the property was acquired by the illegal action of A. W. Terry and J. W. Horton, two stockholders. Action has also been brought by H. D. Miller who claims a balance of \$750 in commissions, to re-open the judgment discharging the receiver, J. T. King, who claims that Miller was paid in full.

The automobile dealer who contemplates adding commercial cars will find the "C. C. J." an invaluable help to him in selecting the lines which he should handle, as all of the cars are described in detail and many other facts are given which will help him in the handling of the cars.



INTERNATIONAL ABSORBS HEWITT

The International Motor Company announces that it has just acquired the properties and business of the Hewitt Motor Truck Company. All the business of the concern was taken over on March first, and the Sales and Executive Departments on that day became amalgamated with the International Company, whose headquarters are at Broadway and 57th Street, with works at Allentown, Pa., Plainfield, N. J., and New York City. The association of the Mack, Saurer and Hewitt trucks makes the position of the International Motor Company one of the most formidable. The range of sizes which this organization offers will include every variation in live load capacity ranging from 1500 lbs. up to ten tons.

NEW ALCO DRIVERS' SCHOOL

The American Locomotive Company, Bridgeport, Conn., as a part of its Service Department, has instituted a course of instruction for drivers of concerns who buy its cars. This course includes a week spent in the shops at the factory learning all the various processes of manufacture, then another week in charge of a truck, accompanied by an expert, this latter course to be preferably through crowded traffic. He is then given full command of a truck for a time, during which the maintenance department gives particular attention to the inspection of the truck at frequent specified intervals.

WARNER GEAR COMPANY TO BUILD THE LANCHESTER-DAIMLER WORM AND WORM WHEEL IN AMERICA

Chas. E. Davis, general manager of the Warner Gear Company, Muncie, Ind., on a recent trip abroad contracted with the Daimler Company and with Mr. Lanchester for the exclusive right to the Lanchester worm and worm wheel for the United States and Canada. The American Ball-Bearing Company has in turn concluded a contract with the Warner Gear Company to supply them with this type of drive for a complete line of worm driven axles.

SWEETLAND HEADS W. C. P.

At a recent directors' meeting of Wyckoff, Church and Partridge, Incorporated, of New York City, makers of the Commer truck, H. M. Sweetland, formerly head of the Class Journal Company, and at present a director in the United Publishers' Corporation, was elected chairman of the Board of Directors. Mr. Sweetland brings with him the experience of his close connection with the automobile industry since its inception.

UNIVERSAL MOTOR TRUCK COMPANY CHANGES HANDS

By a deal recently consummated, Howard Walton, New York City, gained full control of the Universal Motor Truck Company. It is Walton's intention to organize another company and enlarge the business.

The Universal Motor Truck Company was organized about a year ago with a capital of \$350,000. There were ten original stockholders, among whom was Walton.

Vincent Link, the designer of the Universal truck, will be retained by the new organization as chief engineer and designer. The present capacity of the plant will probably be doubled and a general extension policy is to be followed during 1912.

DECATUR MOTOR CAR COMPANY MOVES TO GRAND RAPIDS AND REORGANIZES AS THE GRAND RAPIDS MOTOR TRUCK CO.

The Decatur Motor Car Company, of Decatur, Ind., maker of the Decatur-Hoosier, Limited, has concluded arrangements for removing its plant to Grand Rapids, Mich., where a new company has been formed, to be known as the Grand Rapids Truck Company, to take over the plant of the Decatur Company. The new company has purchased the old Harrison Wagon Works' plant in Grand Rapids and five acres of ground. The moving of the plant from Decatur is already in operation. The new company has elected the following officers: president and general manager, M. E. Brackett; vice president, E. A. Clements; secretary and treasurer, F. T. Huls-wite; additional directors, Carol F. Sweet, Henry L. Adsit, Wm. F. McKnight, John W. Blodgett, W. J. Vesey and John I. Taylor.

MAKERS OF JONZ CARS TO REORGANIZE

American Automobile Manufacturing Company, New Albany, Ind., maker of Jonz delivery cars, will reorganize as the American Automobile Corporation. The original company recently went into the hands of the New Albany Trust Company as receiver, on petition of Carey C. Ellsworth and Carey C. Jones, the organizers and principal stockholders, on account of internal dissention. The assets were given as \$200,000 and liabilities as \$49,000. At a meeting held on February 28th, at which 75 per cent. of the stock was represented, a committee was appointed to organize a new company to be known as the American Automobile Corporation with \$250,000 capital. It is proposed that the new company take over the old stock, giving 40 per cent. in stock in the new company in exchange, the outside creditors to be paid in full. While negotiations are in progress the receiver will be authorized to operate the plant and complete the cars on hand.

C. J. WIDMER is now general manager of the Eclipse Truck Company, Franklin, Pa.

THE WASHINGTON MOTOR VEHICLE COMPANY, Washington, D. C., is in the hands of W. H. Cowart, as receiver.

THE CHASE MOTOR TRUCK COMPANY, Rochester, N. Y., has just completed a three-story addition to its factory, 80 x 140 ft.

THE HATFIELD COMPANY, Elmira, N. Y., has been incorporated as the Hatfield Auto Truck Company, with a capital of \$1,500,000.

THE KNICKERBOCKER MOTOR TRUCK MANUFACTURING COMPANY, New York, is erecting a large new factory at 150th Street near Harlem River.

THE ROWE MOTOR COMPANY, Coatesville, Pa., has reorganized under the name of Rowe Motor Manufacturing Company, and has increased its capital stock to \$500,000.

THE GENERAL MOTORS TRUCK COMPANY, Detroit, Mich., has established a service department with T. P. Meyers in charge.

THE PHILADELPHIA STORAGE BATTERY COMPANY has opened a New York office in the American Building, Broadway and Columbus Circle, in charge of Walter L. Thompson.

THE P. H. P. MOTOR TRUCK COMPANY, Westfield, Mass., has been succeeded by the Westfield Motor Truck Company, which was organized by W. S. McGill, G. Osborne and I. P. Miller.

THE CONSOLIDATED RUBBER TIRE COMPANY, of New York City, and Akron, O., manufacturers of the well known Kelley-Springfield Tires, has changed the name of its company to the Kelley-Springfield Tire Company.

THE CHAMPION WAGON COMPANY, Owego, N. Y., is now in charge of Theo. E. Geer and Fred C. Hill as receivers, with power to continue the business. They expect to keep it going until a reorganization can be effected.

THE STAYER CARRIAGE COMPANY, Auburn Park, Chicago, Ill., state that the fire which recently visited its factory was only a slight one, confined to one floor of one department, and the factory did not lose an hour's time on account of it.

THE FEDERAL MOTOR TRUCK COMPANY, Detroit, Mich., has taken possession of the plant formerly occupied by the Van Dyke Motor Car Company. The main building is 60 x 512 ft. and is convenient to four railroads, having sidings on two of them.

THE KEARNS MOTOR CAR COMPANY, Beavertown, Pa., has changed hands and will hereafter be run by M. C. and W. R. Kearns, known as the Kearns Motor Car Company. In the future all orders will pass through their New York office, which is in Rockville Center, Long Island, N. Y.

THE DEMAND FOR MOTOR FIRE APPARATUS

As predicted in these columns about a year ago, the demand for motor fire trucks, engine and patrols is now far beyond the supply. During the past year the motor equipment in use throughout the country has trebled and the local papers everywhere are teeming with notes as to the performances of the new motor fire engines, but as the economy and efficiency of these machines has become a matter of general knowledge the demand has increased enormously. This is

forcibly demonstrated by the following notes of new apparatus about to be purchased, which have been gleaned from clippings during a period of two weeks.

ALABAMA.

Decatur—Fire Committee is investigating motor apparatus.

ARKANSAS.

Little Rock—City Council are considering purchase of auto fire truck.

CALIFORNIA.

Hanford—Has asked for bids for motor chemical engine.

Sawtelle—Volunteer Fire Company are raising money to buy motor fire engine.

Visalia—City Council are investigating motor fire apparatus.

CONNECTICUT.

Bristol—The Fire Commissioners are contemplating the purchase of a new motor fire ladder truck.

Greenwich—Amorgerone Fire Company have decided to raise money to buy auto fire wagon.

New Canaan—Council is investigating motor fire apparatus.

New Haven—Council has appropriated \$9,000 for purchase of new motor fire engine.

GEORGIA.

Waycross—Council are investigating fire wagons.

ILLINOIS.

Aurora—Fire department has asked for additional motor fire equipment.

Moline—City Council are investigating motor fire apparatus.

Paxton—Is considering the purchase of motor fire wagons.

Springfield—Councils will soon take action on Fire Chief Bolte's recommendation to purchase several motor fire trucks.

INDIANA.

Elkhart—Police department has purchased a police patrol.

Elwood—Will soon purchase motor fire apparatus.

Indianapolis—Board of Public Safety will soon ask for bids for a combination hose and chemical wagon not to exceed \$5,500.

Marion—Fire Chief Crevar has asked City Council for an appropriation for motor fire apparatus.

Newcastle—Movement is on foot for purchase of motor fire apparatus.

Richmond—Council have asked for bids for fire apparatus.

IOWA.

Marshalltown—Bids have been advertised by City Council for motor fire truck.

Waterloo—Fire Chief Dunham is testing out motor fire trucks.

KANSAS.

Hutchinson—City Commissioners have asked for bids for motor fire engine.

Leavenworth—R. E. Nelson, City Commissioner, is urging the purchase of motor fire truck, ambulance and patrol wagon.

MASSACHUSETTS.

Beverly—Council have before it an ordinance appropriating \$6,000 for purchase of motor fire truck.

Gardner—Thomas E. Cody, of the Advisory Board, will bring before the voters the need of an appropriation for an auto fire truck for Company No. 2, in West Gardner.

Marblehead—Board of Engineers have asked for an appropriation for a motor fire truck.

Marlboro—Committee of Councils is considering bids for auto fire trucks.

New Bedford—Committee on Fire Department invites sealed proposals for motor truck chassis.

North Abington—The fire department has asked the town for an appropriation of \$6,000 for a motor fire truck.

Reading—Councils are soon to act on an appropriation of \$5,900 for an auto fire truck.

Stoneham—Town meeting has been called to authorize purchase of auto fire truck.

Wakefield—Councils have appropriated \$5,800 for the purchase of a motor fire truck.

MISSOURI.

Kansas City—Fire Chief J. C. Enger has recommended the purchase of 5 or 6 additional motor fire engines.

St. Louis—Fire Chief Tobin has presented a request for 3 additional motor fire trucks and engines.

NEW HAMPSHIRE.

Portsmouth—Chief Engineer has recommended purchase of motor fire engine.

NEW YORK.

Buffalo—Fire department has decided to add three motor trucks and fire engines to its equipment.

Niagara Falls—is about to make several additions to its motor fire apparatus.

Syracuse—Fire Chief Quigley has recommended that entire horse equipment be replaced with motor apparatus.

OHIO.

Springfield—Council are considering placing their present fire equipment on motor chassis.

Alliance—City Board of Control have purchased an electric ambulance.

PENNSYLVANIA.

Mt. Carmel—The American Hose & Chemical Co. have decided to purchase an auto fire truck.

Philadelphia—Old York Road Fire Co., Ashborne, is raising \$9,000 for purchase of a motor fire engine.

Wilkinsburg—Councils have authorized purchase of a \$5,750 motor fire engine.

TENNESSEE.

Nashville—Council have a bill before them appropriating \$46,000 for motor fire apparatus.

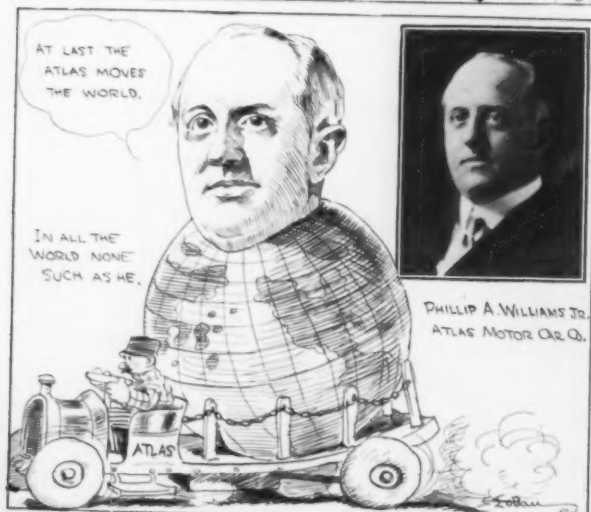
VERMONT.

Barre—Council will soon act upon an appropriation to purchase fire wagon.

WEST VIRGINIA.

Wheeling—Motor fire apparatus will probably be purchased as a result of public demand.

OUR GALLERY OF SALES MANAGERS.



THE COMMERCIAL CAR JOURNAL

Vol. III.

PHILADELPHIA, MARCH 15, 1912

No. 1

Published the 15th of each month by the

CHILTON COMPANY

Market and 49th Streets

Philadelphia, U. S. A.

JAMES ARTMAN President

GEO. H. BUZBY Vice President

C. A. MUSSELMAN Sec'y and Treas.

EDITORIAL DEPARTMENT

JAMES ARTMAN Editor-in-Chief

E. S. FOLJAMBE Managing Editor

WM. J. JOHNSON Traveling Editorial Representative

ASSOCIATE EDITORS

ALBERT G. METZ

J. HOWARD FILE

E. K. LEECH General Manager

SUBSCRIPTION RATES

Including 1912 TABLE OF SPECIFICATIONS of Commercial Cars.

United States and Mexico One Year, \$2.00

Other Countries in Postal Union, including Canada One Year, 3.00

Make checks, money orders, etc., payable to Chilton Company.

Change of Address—Subscribers desiring their address changed, should give the old as well as the new address.

Entered as second-class matter at the Post Office at Philadelphia, Pa.
under the Act of March 3, 1879.

The 1912 Table of Specifications of Commercial Cars will be included in the regular subscription price of \$2.00 per year for the Commercial Car Journal until the supply on hand is exhausted.

SEPARATE COMMERCIAL CAR SHOWS ARE WANTED



In response to the opinion expressed by a number of prominent men in the trade, that commercial car shows should be controlled by the commercial car makers themselves, and that they should be entirely divorced from the pleasure car shows, the following letter was sent out by this journal:

Philadelphia, March 5, 1912.

During the recent National Shows a number of prominent commercial car makers expressed the opinion that it would be better for the motor truck industry if the Commercial Car Shows were separated by several months from the Pleasure Car Shows. They argued that the holding of the Commercial Car Show the week following the Pleasure Car Show, placed commercial cars in a position of secondary importance. There is no doubt that a separate Commercial Car Show, held in October, would attract a great deal more attention, and would be more beneficial to the exhibitors than one held in the dead of winter, which is simply an aftermath of the automobile show.

We believe also that the commercial manufacturers should form their own association to regulate such matters as the holding of shows, the giving of demonstrations, the giving of guarantees and other features of the selling proposition, as well as to accomplish, if possible, standardization in the pro-

duction and rating of motor trucks. The benefits of such an association can be easily realized.

We would like to have your ideas on these subjects, as the Commercial Car Journal desires to go on record as favoring a Manufacturers' Association and Shows, for the benefit of commercial motor car makers only.

Trusting that we may hear from you on the above, we are,

Yours very truly,

COMMERCIAL CAR JOURNAL.

All of the replies received to this inquiry agree with the position taken by the C. C. J., except that several mention the advisability of keeping the commercial car organization within the N. A. A. M. A meeting of the commercial car members of the N. A. A. M. had been called for March 4th and 5th, of which we knew nothing when the above letter was sent out. A report of this meeting will be found elsewhere in this issue.

We believe that it is possible for the commercial car makers to organize just as effectively within the N. A. A. M. as independently, but an organization they should have, which is not controlled by manufacturers who make both pleasure and commercial cars, as under such control the commercial car interests will not receive their just consideration.

Under the present arrangement meetings are held too far apart and matters which should be thoroughly discussed and acted upon are entirely overlooked.

It was but two years ago that the commercial car industry assumed a sufficient importance in the eyes of the trade to warrant a separate exhibit following the week devoted to pleasure cars. During the past year the commercial car has forged ahead so rapidly that in many cities special exhibits of the modern motor truck were held. In New York the Madison Square Garden was well filled, while in Chicago, for the first time, both show buildings were devoted to the exhibition of commercial cars.

There is a very decided feeling among the trade, as represented by numerous letters received in answer to our inquiry, that an entirely distinct and separate commercial car show should be held, divorcing same as completely as possible from the pleasure car exhibit.

The feeling points strongly to the fact that shows corresponding to the present mid-winter National Shows should be held in the early fall for commercial car exhibitors and truck accessory makers, thus separating the show for this branch of the industry entirely from pleasure car shows.

Up to the present time the combination show has, perhaps, been the most advisable for the commercial car manufacturers, but the attendance has always been largely of those interested particularly in pleasure cars and only incidentally in trucks. It is believed that the truck end of the industry has now reached such proportions that separate shows would be a decided advantage, and these could be run on somewhat different lines from the well established custom of the pleasure car manufacturers. Instead of charging 50 cents or one dollar and cutting down to the lowest limit the amount of free tickets distributed, the commercial car show should have but a nominal charge—say 25 cents—simply to keep the floor free from being overcrowded with the merely curious who might interfere with the transaction of business. To all agents, dealers and interested business men tickets should be most freely distributed gratis, thus making it as easy as possible for every interested person to get into the show and have a clear view of all the machines on exhibit, parts, accessories, etc., the nominal charge preventing street urchins and other disinterested persons from blocking the floor.

Business men who are able to show cards or credentials should be admitted at the door without question, no regular tickets being demanded. One of the chief points to be considered in connection with any kind of automobile show is that of placing agencies. Nearly every exhibitor depends in large part upon the shows for meeting and closing deals with those who will handle their goods for the coming season and it is believed that the fall show would in this respect be very advantageous.

The accessory and parts manufacturer is always an important factor in any automobile show and these makers are now being found at not only the pleasure car shows but also at the truck show. The spaces at the shows are none too large at best and are now crowded with many things which do not pertain to commercial cars.

If an entirely separate exhibit were the custom a more complete and better showing of strictly truck parts could be made. The length of time at the shows during the year would be no greater than under the present arrangement, the only disadvantage being the fact that the goods and all the men would have to be away from the factory at perhaps two different times in the year instead of being away double the length of time at one period, slightly increasing shipping cost and railroad fares.

It is believed, however, that the more concentrated interest created in the class of trade particularly desired, by having a separate truck show, would more than offset the other disadvantages.

Nearly all business houses who have the installation of trucks in mind are extremely anxious to get them on the road and in service for the holiday rush and bad winter weather, which is so hard on horses. These business men would, therefore, begin early in the fall investigating the various commercial cars with a view to placing their orders in time for early delivery. This of itself is a sufficient reason for holding the shows in the fall.

It is but a few years in the future when the commercial car industry will be larger than the pleasure car industry has ever been, and it is time that the commercial car makers and associated parts makers began to definitely plan against the time when commercial car business will be of foremost importance to all those connected with automobiles.

NECESSITY FOR MAINTENANCE OR SERVICE DEPARTMENTS



THE commercial car service department is almost an unknown quantity, as but few manufacturers have made any arrangements for establishing such departments. Yet in a few years the number of service departments must be increased at least ten fold. In other words every well established manufacturer, branch house or even large dealer, will be forced to maintain an efficient service department, a department capable of taking care of all the patrons in and around that particular city. Commercial car users are already demanding something of this kind upon which they can fall back in time of need and receive the proper attention. There are really very few business houses, especially among those who have not been using motor driven commercial cars for any great period, who are capable of caring for their cars in such a way that the most can be received from them. It is new, this caring for a motor driven vehicle, and because it takes

the place of the old horse and wagon with its happy-go-lucky methods, more or less of the same easy going handling of the commercial car is sure to result. It is difficult for the average user to recognize the important fact that the horse and wagon is no longer a necessity; and not only this, but that the methods of delivery now employed are as distinct and different as the wheel-barrow is from the modern freight train. A new system must be adopted for caring for this new type of vehicle. New men of an entirely different stamp are necessary if efficiency is to result.

All goes well for a few months. The inherent staying qualities of the present commercial car helps to blind the purchaser to the real needs of the case. The car is driven to its limit just as long as it will run.

When, however, this limit has been reached, then the necessity for the need of a special system and adequate means of caring for the mechanism at once becomes apparent. These the average purchaser is without, and naturally the truck and the industry at large must suffer.

At this point the manufacturer or the agent must step in and show how the cars should be cared for. A service department properly organized will handle all such cases with facility and dispatch, and with very much less cost than the same work can be done by the agent or salesman. It is not only the actual service rendered by such a department that increases the sales of commercial cars, but the mere mental relief which is thus afforded the mind of the purchaser, who is at a loss to know what to do.

One of the greatest drawbacks to the general introduction of commercial cars is the dread in the mind of the average business man of having to care for and make a successful and integral part of his business, an entirely new and untried factor. This feeling of uneasiness toward the commercial car is largely dissipated when the makers or agents for that particular car have a well established and efficient service department which the owner knows he can call upon whenever the situation becomes too complicated for him.

We do not mean to convey the idea, which unfortunately seems to prevail in the minds of some purchasers, that the agent is in duty bound to look after and right every minor difficulty which may be met by the purchaser. We do, however, believe that the service department is absolutely necessary to the commercial car industry and the sooner this becomes an established fact in the minds of the makers and agents the sooner we can expect to have a large number of well appointed and satisfactory service departments. This is a matter which must in the near future be settled by each of the agents and makers, as the demand for such assistance is already growing by leaps and bounds in the ranks of the users. Because such departments are not a necessity in the wagon trade, it does not follow that they are not necessary in the automobile business. The cases as before stated are not at all parallel and the new set of conditions must be squarely faced by the manufacturer and agent as well as by the user.

Can Also Furnish a Supply of Skilled Drivers

Each service department could and should have incorporated with it a school for new drivers so as to be prepared to supply to new purchasers of cars, drivers who have passed through a course of instruction in the construction, care, repair and handling of the machines and can be expected to give the owners good service.

BOSTON COMMERCIAL MOTOR VEHICLE SHOW



FOR the first time Boston is devoting the enormous Mechanics' Building on Huntington Avenue for the entire week to the products of the commercial car manufacturers. In another place will be found a complete list of the exhibitors, not one of the well known manufacturers being omitted. In fact, the show compares favorably with either that of New York or Chicago, in point of decorations, attendance and number of vehicles exhibited. In the amount of business transacted, the show promises also—as the Boston show always has proved—a marked success. The large attendance, particularly among business men, is conclusive evidence of the widespread interest in the commercial car.

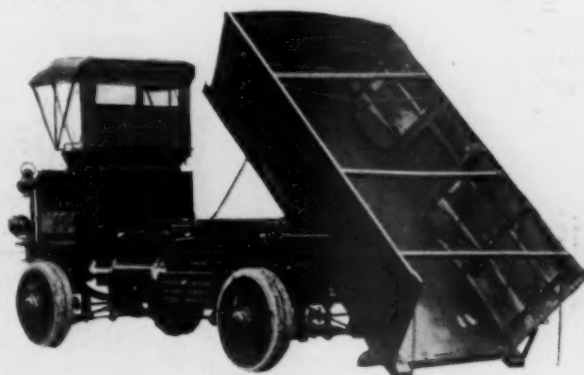
The exhibition of trucks is noticeable on account of the great variety of bodies shown, there being innumerable special coal dumping trucks, some of them motor dumped. In this connection it may be mentioned that fully 1500 of the members of the New England Coal Dealers' Association attended the show and were greatly impressed with the wonderful progress as shown by the highly specialized coal bodies exhibited. This association is now advocating the entire abolition of horse-drawn coal wagons, largely from a humanitarian standpoint, but also on account of the greater range and speed of motor delivery. Unfortunately, people will order coal at a season of the year when it is almost impossible for horses to draw heavy loads, and, when ice and snow is heavy on streets the horses are badly maimed and occasionally have to be shot, and deliveries are extremely uncertain. Similar conditions offer no hindrance to the high-powered modern coal truck. From present indications the horse-drawn coal truck will very soon be a thing of the past in most of our large cities.

Fire apparatus, special delivery wagons, army filtering wagons, and machines fitted with bodies suitable for every

conceivable trade are shown, ranging in size from the lightest three-wheeled delivery van up to enormous ten-ton trucks. Every phase of transportation is well covered and to many who have not been following closely the rapid progress in truck construction the show is a revelation.

The impressive line-up of machines on the outside of the building alone is a show in itself and one most interesting to the business man who likes to be shown what can be accomplished. In the vicinity of the Mechanics' Building are to be seen at all times, trucks with various signs telling of tests or the various performances which they are making, to prove to the "doubting Thomases" that the motor-driven truck is not a thing yet to be developed, but is now capable of carrying on the transportation work of the world.

Electric commercial cars are also to be seen in considerable numbers and the interest shown in them was noticeable. It is reported that the prospects for some large orders are very good and will probably be consummated before the close of the show.



Special Couple Gear Dumping Body. This body raises quickly to any desired angle.

Business men who are able to show cards or credentials should be admitted at the door without question, no regular tickets being demanded. One of the chief points to be considered in connection with any kind of automobile show is that of placing agencies. Nearly every exhibitor depends in large part upon the shows for meeting and closing deals with those who will handle their goods for the coming season and it is believed that the fall show would in this respect be very advantageous.

The accessory and parts manufacturer is always an important factor in any automobile show and these makers are now being found at not only the pleasure car shows but also at the truck show. The spaces at the shows are none too large at best and are now crowded with many things which do not pertain to commercial cars.

If an entirely separate exhibit were the custom a more complete and better showing of strictly truck parts could be made. The length of time at the shows during the year would be no greater than under the present arrangement, the only disadvantage being the fact that the goods and all the men would have to be away from the factory at perhaps two different times in the year instead of being away double the length of time at one period, slightly increasing shipping cost and railroad fares.

It is believed, however, that the more concentrated interest created in the class of trade particularly desired, by having a separate truck show, would more than offset the other disadvantages.

Nearly all business houses who have the installation of trucks in mind are extremely anxious to get them on the road and in service for the holiday rush and bad winter weather, which is so hard on horses. These business men would, therefore, begin early in the fall investigating the various commercial cars with a view to placing their orders in time for early delivery. This of itself is a sufficient reason for holding the shows in the fall.

It is but a few years in the future when the commercial car industry will be larger than the pleasure car industry has ever been, and it is time that the commercial car makers and associated parts makers began to definitely plan against the time when commercial car business will be of foremost importance to all those connected with automobiles.

NECESSITY FOR MAINTENANCE OR SERVICE DEPARTMENTS



THE commercial car service department is almost an unknown quantity, as but few manufacturers have made any arrangements for establishing such departments. Yet in a few years the number of service departments must be increased at least ten fold. In other words every well established manufacturer, branch house or even large dealer, will be forced to maintain an efficient service department, a department capable of taking care of all the patrons in and around that particular city. Commercial car users are already demanding something of this kind upon which they can fall back in time of need and receive the proper attention. There are really very few business houses, especially among those who have not been using motor driven commercial cars for any great period, who are capable of caring for their cars in such a way that the most can be received from them. It is new, this caring for a motor driven vehicle, and because it takes

the place of the old horse and wagon with its happy-go-lucky methods, more or less of the same easy going handling of the commercial car is sure to result. It is difficult for the average user to recognize the important fact that the horse and wagon is no longer a necessity; and not only this, but that the methods of delivery now employed are as distinct and different as the wheel-barrow is from the modern freight train. A new system must be adopted for caring for this new type of vehicle. New men of an entirely different stamp are necessary if efficiency is to result.

All goes well for a few months. The inherent staying qualities of the present commercial car helps to blind the purchaser to the real needs of the case. The car is driven to its limit just as long as it will run.

When, however, this limit has been reached, then the necessity for the need of a special system and adequate means of caring for the mechanism at once becomes apparent. These the average purchaser is without, and naturally the truck and the industry at large must suffer.

At this point the manufacturer or the agent must step in and show how the cars should be cared for. A service department properly organized will handle all such cases with facility and dispatch, and with very much less cost than the same work can be done by the agent or salesman. It is not only the actual service rendered by such a department that increases the sales of commercial cars, but the mere mental relief which is thus afforded the mind of the purchaser, who is at a loss to know what to do.

One of the greatest drawbacks to the general introduction of commercial cars is the dread in the mind of the average business man of having to care for and make a successful and integral part of his business, an entirely new and untried factor. This feeling of uneasiness toward the commercial car is largely dissipated when the makers or agents for that particular car have a well established and efficient service department which the owner knows he can call upon whenever the situation becomes too complicated for him.

We do not mean to convey the idea, which unfortunately seems to prevail in the minds of some purchasers, that the agent is in duty bound to look after and right every minor difficulty which may be met by the purchaser. We do, however, believe that the service department is absolutely necessary to the commercial car industry and the sooner this becomes an established fact in the minds of the makers and agents the sooner we can expect to have a large number of well appointed and satisfactory service departments. This is a matter which must in the near future be settled by each of the agents and makers, as the demand for such assistance is already growing by leaps and bounds in the ranks of the users. Because such departments are not a necessity in the wagon trade, it does not follow that they are not necessary in the automobile business. The cases as before stated are not at all parallel and the new set of conditions must be squarely faced by the manufacturer and agent as well as by the user.

Can Also Furnish a Supply of Skilled Drivers

Each service department could and should have incorporated with it a school for new drivers so as to be prepared to supply to new purchasers of cars, drivers who have passed through a course of instruction in the construction, care, repair and handling of the machines and can be expected to give the owners good service.

BOSTON COMMERCIAL MOTOR VEHICLE SHOW



FOR the first time Boston is devoting the enormous Mechanics' Building on Huntington Avenue for the entire week to the products of the commercial car manufacturers. In another place will be found a complete list of the exhibitors, not one of the well known manufacturers being omitted. In fact, the show compares favorably with either that of New York or Chicago, in point of decorations, attendance and number of vehicles exhibited. In the amount of business transacted, the show promises also—as the Boston show always has proved—a marked success. The large attendance, particularly among business men, is conclusive evidence of the widespread interest in the commercial car.

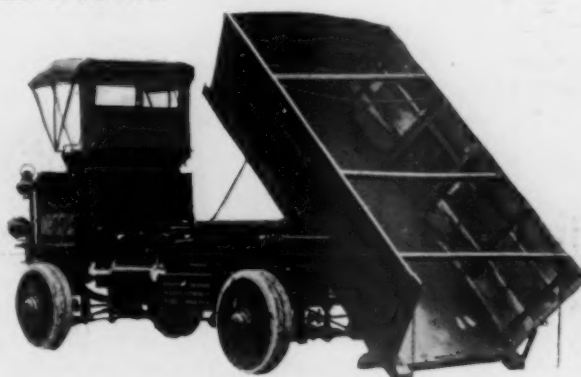
The exhibition of trucks is noticeable on account of the great variety of bodies shown, there being innumerable special coal dumping trucks, some of them motor dumped. In this connection it may be mentioned that fully 1500 of the members of the New England Coal Dealers' Association attended the show and were greatly impressed with the wonderful progress as shown by the highly specialized coal bodies exhibited. This association is now advocating the entire abolition of horse-drawn coal wagons, largely from a humanitarian standpoint, but also on account of the greater range and speed of motor delivery. Unfortunately, people will order coal at a season of the year when it is almost impossible for horses to draw heavy loads, and, when ice and snow is heavy on streets the horses are badly maimed and occasionally have to be shot, and deliveries are extremely uncertain. Similar conditions offer no hindrance to the high-powered modern coal truck. From present indications the horse-drawn coal truck will very soon be a thing of the past in most of our large cities.

Fire apparatus, special delivery wagons, army filtering wagons, and machines fitted with bodies suitable for every

conceivable trade are shown, ranging in size from the lightest three-wheeled delivery van up to enormous ten-ton trucks. Every phase of transportation is well covered and to many who have not been following closely the rapid progress in truck construction the show is a revelation.

The impressive line-up of machines on the outside of the building alone is a show in itself and one most interesting to the business man who likes to be shown what can be accomplished. In the vicinity of the Mechanics' Building are to be seen at all times, trucks with various signs telling of tests or the various performances which they are making to prove to the "doubting Thomases" that the motor-driven truck is not a thing yet to be developed, but is now capable of carrying on the transportation work of the world.

Electric commercial cars are also to be seen in considerable numbers and the interest shown in them was noticeable. It is reported that the prospects for some large orders are very good and will probably be consummated before the close of the show.



Special Couple Gear Dumping Body. This body raises quickly to any desired angle

The three-wheeled tractor of the Knox Company, (known as the Martin tractor) as usual, attracted considerable attention and more so as the P. S. Huckins Lumber Company, of East Boston, just recently placed in service the first tractor of this kind to be used in Boston. As this machine has been described before in this publication, it is already well known to our readers. We herewith show a photograph of it as applied to the lumber service of the Huckins Company.

Among the accessories there are, of course, many of the same exhibitors that showed during the previous week at the pleasure car show, most of them having special lamps, signalling devices, axles, jack shafts, transmissions, etc., suitable for commercial car use. The exhibits of tires are specially numerous, the various block and other solid rubber tires being prominently shown. Recording devices, giving not only the speed but a complete record of the movements of the machines, are also noticeable among the accessories. One feature in which the Boston show might be said to be unique is the fact that steam driven commercial vehicles are shown, as there were none at either New York or Chicago. These are the product of the Stanley Motor Carriage Company, of Newton, Mass.

WALPOLE TRUCK TIRES

Among the accessory exhibits at the Boston show is the Walpole Rubber Company, of 757 Boylston Street, Boston, Mass. This company is exhibiting commercial car tires in various sizes. The Walpole Company announces that its product is the result of the skilled labor of some of the foremost experts from the tire field. The department has at its disposal the complete facilities of the modern plant of the Walpole Rubber Company. The company, which has just entered the field, claims that its tires will be a concentration of all the good features that have been developed in other tires.

The Teel Manufacturing Company, of Medford, Mass., manufacturer of tops, is exhibiting the Teel Woodworth trucks at Boston for the first time.

An interesting exhibit is that of the Lally Commercial Body Company, 21 West First Street, South Boston, Mass. This exhibit contained several of the latest Lally dumping bodies for coal trucks. One of these, in particular, is note-



Lally Dumping Body. This body not only raises, but is swiveled so the load can be dumped in any desired direction

worthy, as the body, besides elevating, turns on a pivot, so that the load can be discharged in any desired direction.

LIST OF EXHIBITORS, BOSTON COMMERCIAL MOTOR VEHICLE SHOW, MARCH 13-20, 1912

Company.	Agent.	Car.
Autocar Co.	Autocar
American Locomotive Co.	Alco
Atterbury Motor Truck Co.	Atterbury
Argo Electric Vehicle Co.	Argo Electric
Anderson Vehicle Co.	Anderson
Buick Motor Co.	Buick
Bowman Co., The J. W.	Waverly Electric
Baker Motor Vehicle Co., The—Phelps, Frank N.	Baker Electric
Bessemer Motor Truck Co.	Bessemer
Couple Gear Freight Wheel Co.—Eldridge, W. E.	Couple Gear
Clark, Edward S.	Clark
Cameron Car Co.—Standard Motor Truck Co.	Cameron
Commerce Motor Car Co.; Motor Power Wagon Co.—Curtis-Hawkins Co., The	Commerce, Mora
Chase Motor Truck Co.	Chase
Dayton Auto Truck Co.—Whitten-Gilmore Co., The	Dayton
Decatur Motor Car Co.	Decatur
Dodge Motor Vehicle Co.	Buick
Duren & Kendall.	
Eckhardt Motor Truck Co.	Eckhardt
Eastern Motor Truck Co.	
Federal Motor Truck Co.—Whitten-Gilmore Co., The	Federal
Ford Motor Co.	Ford
Gramm Motor Truck Co.	Gramm
Garford Co., The	Garford
General Motors Truck Co.	Reliance
General Motors Truck Co.—Butler Motor Truck Co.	Rapid
General Vehicle Co.	G. V. C. Electric
Grabowsky Power Wagon Co.—McCleary, Lewis S.	Grabowsky
Hercules Motor Truck Co.	
International Harvester Co. of America	International
Kelly Motor Truck Co.—Eastern Motor Truck Co.	Kelly
Kissel Kar Co., New England Branch	Kissel Kar
Knox Automobile Co.—Underhill Co., The	Knox



Novel Tractor Hauling Lumber on Ordinary Wagon. This tractor, manufactured by the Knox Company, Springfield, Mass., is shown in use at Boston, during the show, by P. S. Huckins Company

Company.	Agent.	Car.
Locomobile Co. of America.....		Locomobile
Lippard-Stewart Motor Car Co.—Whitney-Barney Co.,		Lippard-Stewart
Lozier Motor Co.....		Lozier
Lansden Co., The.....		Lansden Electric
Lauth-Juergens Motor Car Co.....		Lauth-Juergens
Mais Motor Truck Co.—Smith, R. L. and H. H.....		Mais
Mack Motor Truck Co.....		Mack
Mercury Mfg. Co.....		Mercury
Morgan Motor Truck Co.....		Morgan
McIntyre Co., W. H.—Standard Motor Truck Co.....		McIntyre
Peerless Motor Car Co. of N. E.....		Peerless
Pierce-Arrow Motor Car Co.—Maguire Co., The J. W.....		Pierce-Arrow
Posa Motor Co.....		Posa
Packard Motor Car Co.—Fuller, Alvan T.....		Packard
Reo Motor Car Co.—Linscott Motor Co.....		Reo
Stearns Co., F. B.—MacAlman, J. H.....		Stearns
Sanford, Herbert Co., The.....		Sanford
Stanley Motor Carriage Co.....		Stanley
Speedwell Motor Car Co.—Curtis-Hawkins Co., The.....		Speedwell
Schlottelback Mfg. Co., L. E.....		Koehler
Sternberg Mfg. Co.—Hanson Bros.....		Sternberg
Sandusky Auto Parts and Motor Truck Co.—Stevens, Chas. S.,		Sandusky
Teel Mfg. Co.....		Teel Woodworth
Universal Motor Truck Co.....		Universal
United Motor Boston Co.....		Sampson
Vellie Motor Vehicle Co.....		Vellie
Victor Motor Car Co.....		Victor
White Co., The.....		White
Walker Vehicle Co.....		Walker Electric
Wyckoff, Church & Partridge, Inc.—Dodge Motor Vehicle Co.,		Wyckoff
Saurer, Commer and Pope Hartford		

ACCESSORIES AND PARTS

Ames Auto Jack Truck.....	Jacks
American Technical Society.....	Publications
Bennett, P. D. H. & Co.....	
Clark Foundry Co.....	Punch and shear combined, etc.
Clayton Air Compressor Works.....	Air Compressors and Pumps
Deane Steam Pump Co.....	
Knight, Margaret E.....	K-D Sleeve Valve Engine
Leland, W. H. & Co.....	Machinery
Lunt Moss Co.....	Pumping and Lighting Plants
Moore-Smith Co.....	Fur Coats and Robes
New England Tel. & Tel. Co.....	
Pyrene Co. of N. E.....	Fire Extinguishers
Raymond Engineering Co.....	R. V. Motors
Sheldon Axle Co.....	Axles, Springs, Ball Bearings, Jack Shafts, etc.
Standard Oil Co. of N. J.....	Lubricants

MOTOR AND ACCESSORY MANUFACTURERS

Aristos Co., The.....	Mondex Mufflers and Shock Absorbers
American Infusion Steel Process Co.....	
American Storage Battery Co.....	Storage Batteries
Automobile Lighting Co.....	Frery Lighting System
Ajax-Grieb Rubber Co.....	Tires and Inner Tubes
Atlas Chain Co.....	Anti-Skid Chains and Quick Attachable Grips
Acheson Graphite Co.....	Graphite and Graphited Grease
Boyd, F. Shirley.....	R. I. V. Bearings
Bucklin & Co., Walter S.....	Grease and Oil
Borne, Serymaer Co.....	Driving Chains, Sprockets, Steering Apparatus
Bowser & Co., Inc., S. F.....	Gasoline and Oil Storage Outfits
Coes Wrench Co.....	Wrenches
Continental Caoutchouc Co.—G & J Rubber Tire Co.—U. S. Tire Co.,	
	Tires
Columbia Lubricants Co., of New York.....	Oil, Grease, Soap and Polish
Crane & Co., L. M.....	Oil, Grease, Soap and Metal Polish
Consolidated Rubber Tire Co.—Kelly Springfield Tire Co.....	Tires

THE GENERAL ELECTRIC COMPANY is reported to be negotiating for the purchase of the Church Balance Gear Company, which controls the patents of the Couple Gear System of four wheel gas electric drive, with the idea of pushing this type of construction in a large way, not only in the commercial car field but also in other lines of trade.

The active stockholders of the A. O. Smith Company, Milwaukee, Wis., who recently brought out a new worm driven truck, are endeavoring to purchase all of the shares of the company held by stockholders not actively engaged in the business. The outstanding stock of this account is said to amount to \$500,000, the total capitalization of the company being \$12,000,000.

It is alleged that 200 ex-convicts have chauffeurs' licenses in New York City and run taxicabs and other motor vehicles. So they have fine facilities for crime. The police claim that in issuing such licenses the line should be drawn on jail-birds and a bill is now before the Legislature to prohibit the licensing of chauffeurs who have been convicted of a crime and provide for the revocation of such licenses now held.

Company.	Agent.	Car.
Cramp & Sons Ship and Engine Bldg. Co., The Wm..	Bearing	
	Metal, Castings, Bronze Bars, etc.	
Current Indicators, Current Rectifiers and Transformers, Elec-		
	tric Motors	
Diamond Rubber Co.....	Tires and Sundries	
Diagonal Block Tire Co.....	Solid Tires	
Dean Electric Co.....	Horns, Lighting Outfits, Engine Starters	
Detroit Tool Sales Co.....	Tools	
Edison Storage Battery Co.....	Batteries	
Empire Tire and Rubber Co.....	Tires and Accessories	
Elsner, Harry & Co.....	Elsner Magnetos	
Eagle Oil & Supply Co.....	Oil, Grease and Packing	
Electric Storage Battery Co.....	Batteries and Current Rectifiers	
Fisk Rubber Co., The.....	Tires, Inner Tubes, Removable rims, etc.	
Federal Rubber Mfg. Co.....	Tires, Inner Tubes, Tire Sleeves	
	Tubing	
Firestone Tire & Rubber Co., The.....	Tires	
Gray & Davis.....	Lamps, Acetylene Gas Generators, Dynamos and	
	Lighting Outfits	
Goodrich Co. of New York, The B. F., Tires, Cement, Rubber		
	Bumpers, etc.	
Goodyear Tire & Rubber Co.....	Tires, Inner Tubes, Rubber Bump-	
	ers, etc.	
Hartford Rubber Works—Morgan & Wright—U. S. Tire Co.....	Tires	
Hartford Suspension Co.....	Shock Absorbers, Engine Starters and Jacks	
Harris Oil Co., A. W.....	Grease and Oil	
Hoffecker Co., The.....	Speed Indicators	
Holtzer-Cabot Electric Co., The.....	Magnetos, Dynamos, Horns,	
	Spark Coils, Batteries, etc.	
Ideal Oil Pump & Tank Co.....	Oil Tanks and Pumps	
Jones Speedometer, The.....	Speed Indicators, Odometers, Clocks,	
Keystone Lubricating Co.....	Oils, Greases and Grease Cups	
Mosler & Co., A. R.....	Spark Plugs, Timers, Distributors, Gasoline	
	Purifiers, etc.	
Millbury Steel Foundry Co.....	Steel Castings	
Meyers Bros.....		
Marburg Bros., Inc.....	"Mea" Magnetos, "S. R. O." Ball Bearings,	
	"Marburg-Hagen" Springs, "Lodge" Spark Plugs	
Motz Tire and Rubber Co.....	Tires	
National Carbon Co.....	Ignition Batteries, Spark Coils, Ammeters,	
	Voltmeters, etc.	
Lee Tire & Rubber Co.....	Tires, Inner Tubes, Inner Tire Protectors,	
	Horns and Bulbs	
N. Y. & N. J. Lubricants Co.....	Grease, Non-Fluid Oil and Grease	
	and Oil Guns	
Philadelphia Storage Battery Co.....	Batteries	
Pennsylvania Rubber Co.....	Tires and Rubber Goods	
Robinson & Son Co., Wm. C.....	Oil, Graphite, Grease and Timing	
	Gear Compound	
Remy Electric Co.....	Magnetos	
Standard Auto Supply Co.....	Parts and Accessories	
Sawyer Oil Co., Howard B.....	Graphite, Grease, Metal Polish	
Steel Specialties Co.....	Washers, etc.	
Sewell Cushion Wheel Co.....	Cushion Truck Wheels	
Stewart & Clark Mfg. Co.....	Speed Indicators and Odometers	
Swinehart Tire & Rubber Co.....	Tires	
Standard Roller Bearing Co.....	Ball and Roller Bearings and Axles	
Spiltdorf, Inc., C. F.....	Magnetos, Spark Coils, Spark Plugs,	
	Switches, Distributors	
The Air Shock Absorber.....		
Underhay Oil Co.....	Oil and Grease	
U. S. Light and Heating Co.....	Batteries	
United Rim Co.....	Demountable Rims	
Vacuum Oil Co.....	Grease and Oil	
Veeder Mfg. Co.....	Odometers, Revolution Counters, Tachometers,	
	Castings	
Walpole Rubber Co.....	Tires, Rubber Spring Bumpers, Matting,	
	Tires and Insulating Tape	
Whittaker Chain Tread Co.....	Anti-Skid Chains, Portable Cranes	
	and Chain Hoists	
Whitney Mfg. Co.....	Chains, Chain Belts, Chucks, Milling Cutters, etc.	
Westinghouse Electric Mfg. Co.....	Charging Apparatus, Dynamos,	

LOCAL SHOWS WERE NUMEROUS

During the past months, local shows were held in a large number of cities, and in each of these the commercial motor cars occupied a considerable portion of the exhibition space, but as these exhibits were practically all repetitions of those shown at New York, Chicago, Philadelphia and Boston, we give only a list of the more prominent of these shows, which were as follows:—

February 3d to 10th—Pittsburgh, Pa., Albany, N. Y., Harris-	
burg, Pa., and Montreal, Can.	
February 12th to 17th—St. Louis, Mo., commercial cars only;	
Atlanta, Ga., Troy, N. Y., Kansas City, Mo., Ottawa, Can.,	
and Grand Rapids, Mich.	
February 17th to 24th—Newark, N. J., Pittsburgh, Pa., Min-	
neapolis, Minn., Omaha, Neb., Cincinnati, Ohio, and Hart-	
ford, Conn.	
February 20th to 28th—Baltimore, Md., commercial cars only,	
and Toronto, Can.	
February 22d to 29th—Cincinnati, O.	
February 24th to March 2d—Elmira, N. Y., Brooklyn, N. Y.,	
Paterson, N. J., and Davenport, Ia.	
March 2d to 9th—Columbus, O., Des Moines, Ia., Louisville,	
Ky., and Tiffin, O.	
March 12th to 16th—Denver, Col., and Syracuse, N. Y.	



Mercury Air-Cooled Commercial Cars

One Thousand Pounds Carrying Capacity—Power Plant a Two-Cylinder Opposed Air-Cooled Unit



MERCURY commercial cars of 1000 lbs. carrying capacity are manufactured by the Mercury Manufacturing Company, 4110 South Halsted Street, Union Stock Yards, Chicago, Ill. These vehicles are built complete in the company's own plant.

One Chassis

There is one general chassis design and various types of bodies to meet individual services are to be had. The chassis construction is well set forth in an accompanying illustration under which the various specifications are noted.

Air-Cooled Engines

The Mercury prime mover is a two cylinder, opposed, air-cooled unit. The main reason that this type is employed is to make for simplicity of operation, for let it be understood that these cars are devised primarily for the smaller user who obviously does not want a complicated car, especially as it is to be operated by a low or moderate priced man.

The annular, radiating fins are cast with the cylinders and the heads are formed separately, these being screwed to place. Cast with the cylinders are two supporting lugs by means of which the engine is anchored. The intake valves are auto-

matic, the exhaust mechanically operated and a peculiar form of valve spring is employed, this shown in an accompanying component group illustration. The cylinders are carefully finished in special machines and every precaution is taken to insure the best results.

The pistons are flat topped and follow the usual construction, though the connecting rods are U shaped, fitted with plain bearings and shims. There are three compression rings and four oil grooves for each piston. The wrist pin is retained in the piston. Bearings throughout the engine are plain.

Planetary Transmission

Because of its simplicity, the planetary transmission is employed and the gears, always in mesh, reduce likelihood of damage at the hands of an indiscreet driver. Investigation shows that really capable drivers are in the minority and it remains for the designer of a car to at least meet the situation half way. Ostensibly to provide a device that is fool proof, so called, is quite desired. This feature has been considered in detail in the Mercury construction.

This Mercury set differs somewhat in that the two forward speeds and reverse are attained with one lever. The natural tendency is to advance the lever to go forward, and



Fig. 1. Mercury Chassis Fitted With Panel Type Bodies. Body equipment is optional, dimensions are as follows: length outside, 110 in.; inside actual carrying space, 72 in. long, 38 in. wide, height inside express body, 10 in.; canvas top or panel top 56 in. Wheel base is 85 in. and tread, 56 in. Carrying capacity is 1,000 lbs. The open express car is \$750; canvas panel, \$850; full wood panel with bevel plate-glass side and rear windows, \$875; fore door wood panel with sliding side doors is \$900.

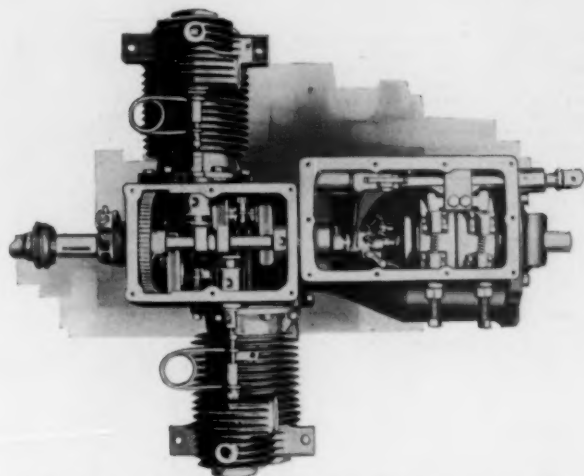


Fig. 2. The Mercury Unit Power Plant With Crank Case and Gear Box Covers Removed. The valve spring used rests on lock washers. Cylinders are cast separately and are $4 \times 4\frac{1}{4}$ in., heads formed separate and screwed to place. The transmission case is bolted to the engine crank case and forms a unit with it. The clutch is of three fiber disc type and but one lever is used to make the two forward speeds and reverse. All transmission gears are $\frac{3}{4}$ in. face. The low and reverse speed exterior adjusting studs are shown.

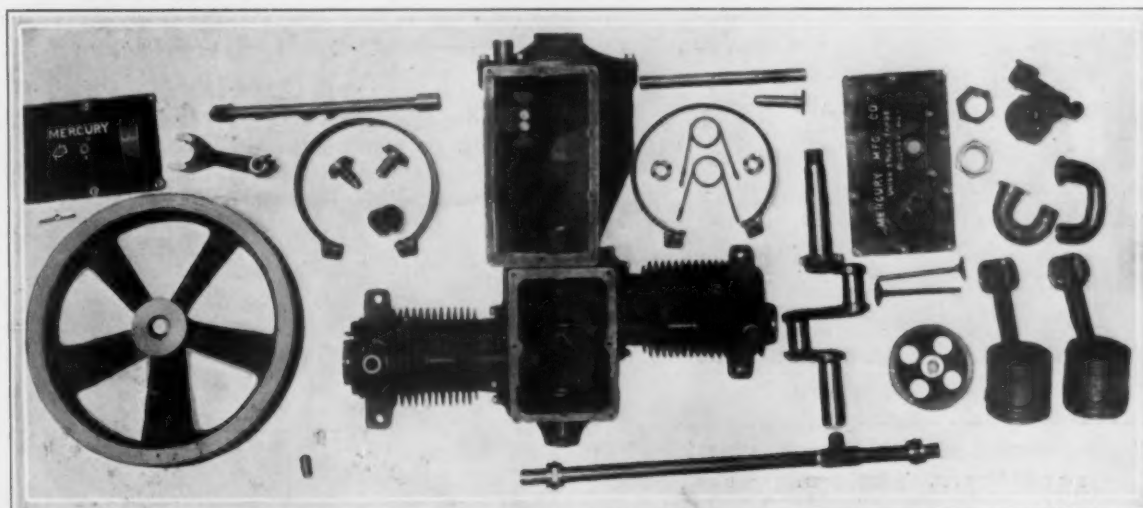


Fig. 3. Disassembled View of the Mercury Air-Cooled Engine. All bearings are plain. The automatic intake valves are $1\frac{3}{4}$ in. diameter, mechanical exhaust $1\frac{1}{4}$ in. The push rods are $\frac{3}{4}$ in. diameter. The pistons are fitted with $\frac{1}{4}$ in. rings pinned to place. The wrist pins are $1 \times 2\frac{3}{4}$ in., held in the pistons. Crank pin bearing adjustment is through shims. The transmission bands are shown, also the fan-spoked flywheel, which is carried on the front end of the shaft. Lubrication mechanical, force feed and splash.

this is done; pulling back slightly engages the low speed, while further back there is the reverse. Low and reverse speed adjustments are made from without the case. The gear box is malleable and the gears operate in grease.

Between the jack shaft and the transmission is a universal jointed shaft, the cardan shaft proper being enclosed.

The bevel gear differential is equipped with ball bearings, while the jack shaft outboard is fitted with roller bearings. The sprockets are steel forgings. All shafts in the Mercury are chrome vanadium steel. The rear wheel sprockets are bolted to a ring or carrier on the wheel through alternate spokes, thus firmly held in place.

Brakes

Internal expanding brakes are worked through a pedal at the right side of the car. These rear wheel members, $10 \times 2\frac{1}{2}$ in., are faced with Raybestos. The pedal may be latched at any desired position. The pull rods are steel.

Brake and driving strains are taken up through cast steel radius rods, by means of which chains are adjustable.



Fig. 4. Automatic Air Intake Valve and Its Cage Used on Mercury Commercial Cars.

Frame

An oak frame is used, this reinforced by steel plates $1\frac{1}{2}$ in. wide, these plates extending the full length of the side rails. The member is also reinforced by cross members and diagonal braces, these $1 \times \frac{1}{8}$ in.

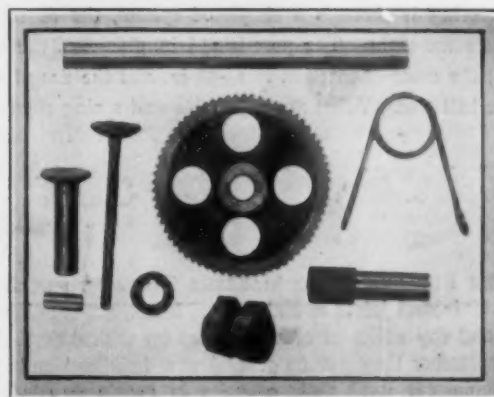


Fig. 5. Cam Shaft, Cam, Cam Gear, Push Rod and Valve Spring Are Shown Here, as Used on Mercury Commercial Cars

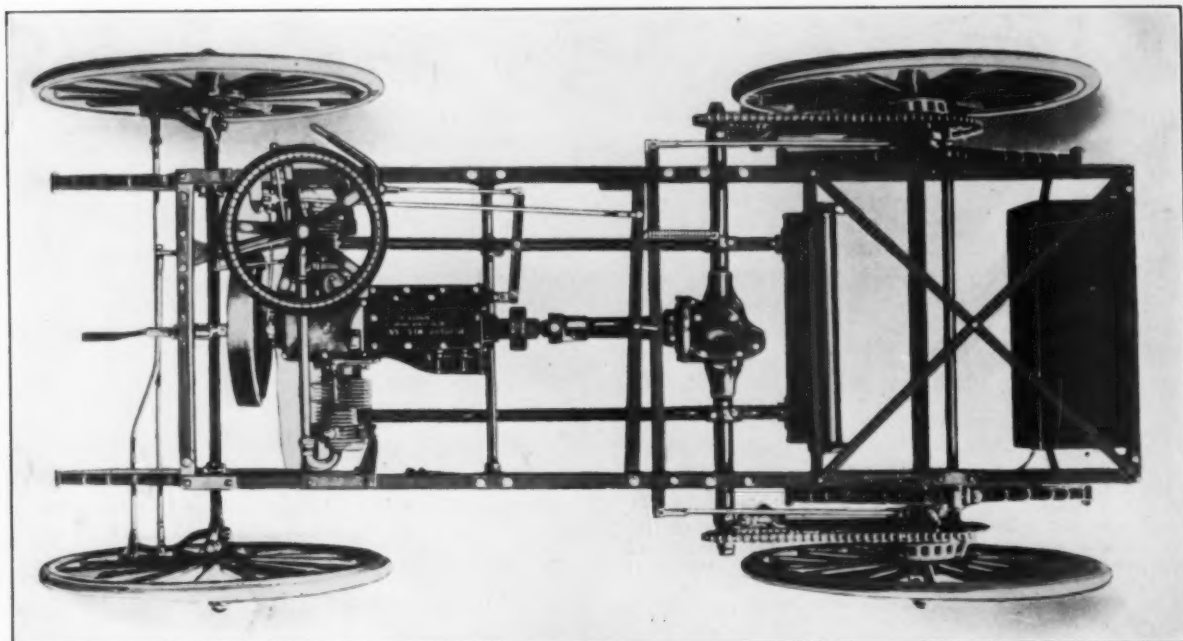


Fig. 6. Top View of Mercury Chassis: showing the location of the two-cylinder, four-cycle, air-cooled motor, with which the planetary transmission is a unit. The jack shaft is $1\frac{1}{8}$ in. diameter, the propeller shaft $1\frac{1}{4}$ in. and the master bevel and driving pinion are 1 in. face

Full-Elliptic Springs

Full elliptic springs are used, these set at a slight angle. It is the belief of the makers that this type best meets conditions. The front members are $36 \times 1\frac{1}{2} \times 5$ in., the rear same size, except that there are two more leaves. $\frac{3}{8}$ in. half round, steel clips are used, the rear set top support being on a cross bar of the frame.

Wheels

The wheels are wood, 38 in. front and 40 in. rear, tires all around $1\frac{3}{4}$ in., solid rubber.

Front and rear axles are steel forgings, the front formed with integral steering yokes $1\frac{3}{8}$ in., rear axle $1\frac{1}{2}$ in., both front and rear members set. Wheel bearings are cup and cone ball.

Steering

Steering is through a simplified system, the control being from the right. The post is $1\frac{1}{8}$ in. diameter, the wheel 16 in.; the cross connection is 13-16 in. and the drag link $\frac{3}{4}$ in., the ball 1 in. Yokes are adjustable and spring checks are used.

Control

Ignition equipment consists of a storage battery, coil and circuit breaker. The coil is non-vibrating and as the spark is set there is need only for the gas lever under the steering wheel. Ignition is by jump spark.

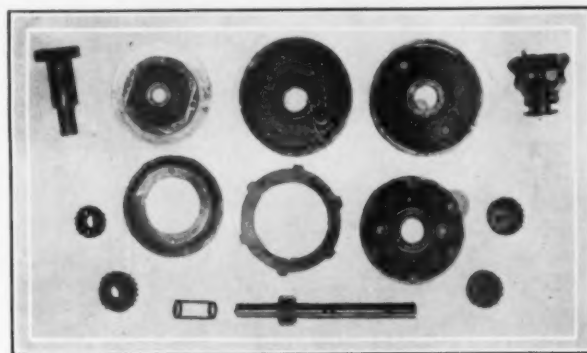


Fig. 7. Here Are Shown the Disassembled Components of the Mercury Transmission: toggle assembly is at the lower left, the fiber clutch plates at the top center.

The carburetor is a simple device of the company's own manufacture, and will be noticed in the engine group.

THE BLOOD BROTHERS MACHINE COMPANY, manufacturers of Universal joints at Kalamazoo, Mich., are running both night and day shifts in order to keep up with orders. Since last September they put up several new buildings and added new equipment until their capacity is nearly doubled over what it was at that time. At the present time they manufacture Universal joints exclusively.

Are the trucks costing you more money than you anticipated? Possibly you are wasting money somewhere along the line and are not aware of it. Did it ever occur to you that by perusing a good periodical devoted to the truck user and manufacturer, you would be able to obtain information which would make your service a better paying proposition? We refer you to this journal,—the COMMERCIAL CAR JOURNAL.

Stegeman Long Wheel Base Commercial Cars



STEGEMAN commercial cars are manufactured in five sizes of chasses; namely, one, two, three, four and six tons load capacity, by the Stegeman Motor Car Company, Milwaukee, Wis. This concern, in common with many others who have come into the truck industry, does not claim to produce a large number of cars in a given season; that is not the policy at all. Rather it is to build fewer vehicles and build them right. This is a desirable policy to entertain, as it ensures more thorough attention to details, which means much in commercial car construction.

in pairs; but in either case a unit power plant is had. The two-ton car engine is of the en bloc type, the cylinders formed with integral water jackets, with ample attention to valves. The pistons follow the usual construction and are fitted with $4\frac{1}{4}$ in. compression rings. The wrist pins, hardened and ground steel, and hollow, are clamped in the connecting rods with pinch bolts, which disposition, of course, makes for greater bearing surface. In the engine of the two-ton car the pins are 1 in. diameter, in the four-ton the unit is $1\frac{1}{4}$ in. The integral piston bosses form a satisfactory bearing surface for the steel pins. There are



Showing the Long Wheel Base of Stegeman Commercial Car

From all appearances painstaking care is expended in making each Stegeman unit complete.

In the main, all five chasses are pretty much the same—increase in size of parts, of course. The same distinctive features are to be found in all models.

Salient Features

To begin with, it will be noted that there is here expressed the overhang at the rear of the vehicle, which feature is at present a much mooted subject among the conservative fraternity: to have or not to have this overhang is the question; here it obtains. Eighty per cent. of load is on the rear wheels.

Note also that the motor is carried forward under a metal hood, as in a pleasure car, readily getatable,—no maker of a pleasure car who knows the game would now think of disposing the prime mover anywhere but forward under the bonnet. The driver then has a roomy seat not too high from the ground and everything is accessible. It will be noted that the chains are enclosed.

Four-Cylinder Motors

The four-cylinder motor is favored in all Stegeman cars. In the small vehicles cylinders are cast en bloc, in the larger

four oil grooves below the piston pins, the pistons reinforced by interior stiffening ribs.

All Stegeman engines are of the L type, valves on the left side, the springs closed in with cover plates held in place through large-sized wing bolts. In the two-ton car the motor valves are $1\frac{1}{8}$ in. in the clear, and in the four-ton they are $2\frac{1}{4}$ in.

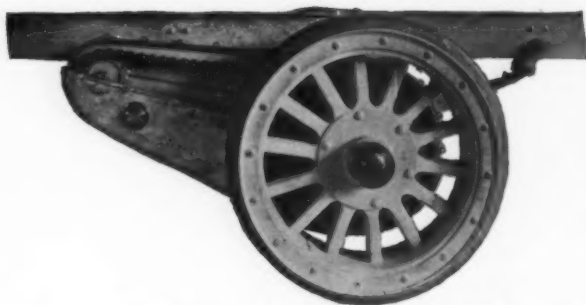
Three-Bearing Crank Shaft

Though the en bloc construction prevails in the smaller cars, a three-bearing crank shaft is used, so there is rigid support. In the two-ton vehicle the shaft is $1\frac{1}{2}$ in. in diameter, in the four-ton $1\frac{3}{4}$ in. Bearings are 3 in. long, except at the flywheel end, where they are 4 in. In the four-ton the main bearings are $3\frac{1}{2}$ in. and at the flywheel end $4\frac{1}{4}$ in. The flywheel is $17\frac{1}{2}$ in. in diameter, bolted to the shaft flange.

Motor gears are helical cut, housing cover supporting starting crank.

Crank Case

The crank case is formed in two sections, is aluminum, and parted on the center line of the bearings. At the rear end of the case the member is enlarged to form a housing for the flywheel, which is necessary because of the unit con-

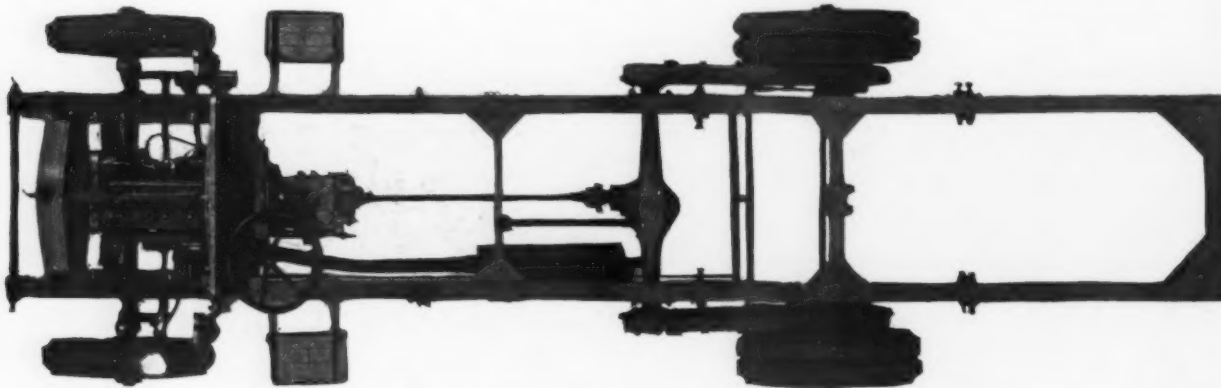


Chain Cover Used on Stegeman Cars. Chain operates in oil bath. Main body of the housing is steel, cover plates aluminum

struction. The four supporting lugs, heavily ribbed, are cast with the upper section of the case. The crank shaft is supported in the upper section, so that removal of the bottom section causes no disturbance of these members.

Clutch and Transmission

A multiple-disc dry-plate clutch is used, as shown in the illustrations of the motor; fifteen plates in the two-ton car,



Top View of Stegeman Chassis

twenty-one plates in the four-ton model. The contact is steel against asbestos, bearing for thrust, annular.

The transmission is a three-speed and reverse member, gears nickel steel. These are 1 in. face in all cars, except in the one-ton model, where they are $\frac{3}{4}$ in. face. In all models pitch is 6-8. Chrome-nickel steel is used in the six-ton model. Gear teeth are short stub type. In all cars the countershaft is $1\frac{1}{2}$ in., the main shaft $1\frac{1}{2}$ in., nickel steel being the material used.

Rather a symmetrical housing is employed for the differential and jack shaft, this latter of the so-called full-floating type. Face of the master bevel is $1\frac{1}{2}$ in. in the one, two and three-ton cars and $1\frac{3}{4}$ in. in the four-ton model. Bevel pinion is of the same face of course, pinion and shaft a one-piece forging. Thrust bearings are fitted, adjustment being by means of threaded collars, which are easily locked to place. There are four bevel pinions in the differential, the bevel pinion and the master bevel running in or on bronze bushings.

Final drive is through side roller chains in the two, three, four and six-ton cars, these, as before mentioned, housed in, and running in oil; one-ton, drive, spiral gear and full-floating axle.

Chain Covers Serve As Radius Rods

A peculiar feature of these chain covers is that they are made to serve as radius rods, chain adjustment forward

being effected through eccentrics. The main body of the housing is made of steel, the cover plates, which are bolted to place, aluminum. This construction is well set forth in the illustrations herewith.

The front sprockets have sixteen teeth in the two-ton car, rear fifty-four teeth. In the three, four and six-ton cars front teeth number fifteen, rear forty-five. Retention of sprockets follows the usual practice.

Frames

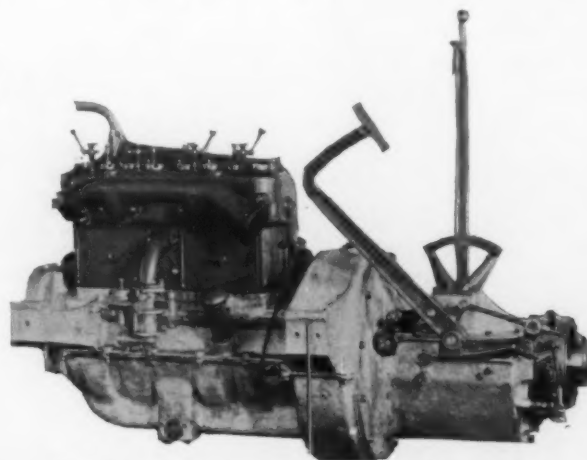
The frame, on the one-ton car, is 5 in. pressed steel, $\frac{1}{4}$ in. stock, 2 in. flange. The two-ton car is equipped with a 5 in. standard channel frame, three-ton 6 in. ship channel, four-ton 6 in. ship channel, and six-ton with a 6 in. ship channel, heavily trussed. Frames are reinforced by the usual array of cross members and gusset plates, hot-riveted to place.

Tires

Rear tires are 34 x 4 in. on the one-ton, 36 x 3 in. dual on the two-ton, 38 x 4 in. dual on the three-ton, 40 x 5 in. dual on the four-ton, and 40 x 6 in. dual on the six-ton. In the

case of the two-ton car, used for suburban work, 5 in. singles are fitted. The one-ton car is to be had with pneumatic equipment when so ordered, 34 x 5 in. members with demountable rims being used.

Front tires otherwise on the one-ton car are 34 x 3 in., 34 x 4 in. on the two-ton, 36 x 4 in. on the three-ton, 36 x 5 in. on the four-ton, 36 x 6 in. on the six-ton. Wheels are

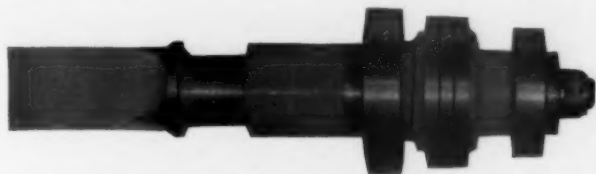


En Bloc Motor Used in the Two-Ton Stegeman Commercial Car

wood, artillery type, the members of the one, two and three-ton cars having fourteen spokes.

Axles

Front and rear axles of the Stegeman commercial cars are nickel-steel forgings, the pivots and front steering knuckles working on ball bearings. The front member is center-dropped and formed with integral steering jaws.



Axle Showing the Inner and Outer Annular Ball Bearings on the Sleeve, With Thrust Bearing Interposed

In an accompanying cut is shown the method of mounting the bearings, which are annular ball type. Two bearings are employed, outside and inside, with a thrust bearing in the center. The bearings are mounted on sleeves, so that removal of the wheels is a simple matter and does not alter adjustment.

Le Moine members are imported, the fronts and rears being semi-elliptic. Retention is in the usual manner, though the nickel-steel spring bolts are hollow and bronze bushings are liberally used. Lubrication is through grease cups. Silico-mangano steel is the material employed for the leaves, of graduated thickness, and varied in number according to the car.

A supplementary cross spring is also fitted, except on the one-ton car, anchored at the top center to a cross member of the frame and coming into play when the car has been loaded. This, of course, bears on the axle.

Cooling, Ignition and Carburetor

An attractive vertical flat-tube cooler, centrifugal water pump, and ball-bearing one-piece belt-driven fan complete the cooling accessories; jackets, as previously mentioned, being cast integral with the cylinders.

Ignition is automatically controlled; the Eisemann magnet, located on the right and driven from the water-pump shaft, being used. The coupling is drilled with numerous holes, so that setting and timing of the instrument is somewhat simplified.

A float-feed, governor-controlled carburetor is employed and is operated through a foot lever located in the floor board. The fuel tank is disposed under the driver's seat, feed by gravity; fifteen gallons capacity in the one-ton car, eighteen in the two-ton, and twenty in the others.

A fly-ball governor, fully enclosed, is fitted, operating through a Bowden cable, which passes around the cylinder from the right side forward; a butterfly valve in the intake pipe.



Spring Hanger Used on Stegeman

There are two sets of brakes, one on the propeller shaft, the other in the rear wheel cast-steel drums. The service brake is that on the propeller shaft, the action of which is cushioned through the torquerod, lined with a nonburning material. The emergency set is in the rear wheel drums.

Oiling is by force feed and splash. The lower section of the crank case is formed with an integral subbase, which contains the oil, pumped by means of a double plunger pump actuated from off the cam shaft. Under each connecting rod there is the individual oil dip.

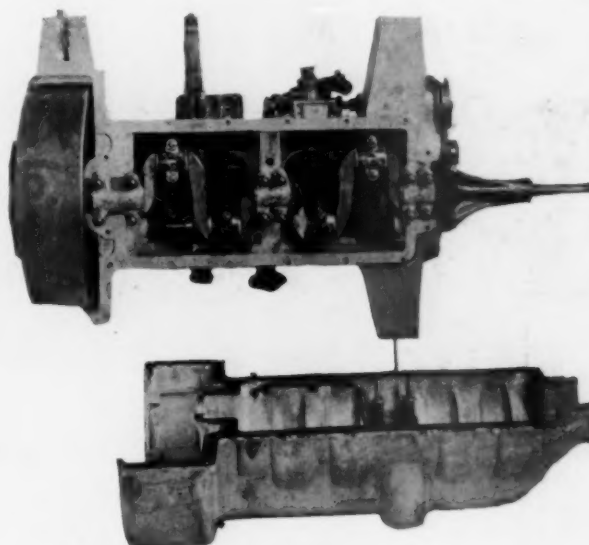
Left Side Steering and Center Control

A feature of the left-drive Stegeman trucks is that the control lever is worked by the right hand, and protrudes through the center of the floor boards, being supported in the cover plate of the transmission housing.

In all respects the control is standard. The clutch pedal also works the service brake. In such cases as desired, the hand wheel will be equipped with a hand throttle lever, but, as a usual thing, this is not used; instead there being a foot accelerator.

Bodies

The Stegeman chassis, of whatsoever size, is available for all types of bodies. The platform on the short chassis is 7 ft. long in the one-ton car and 9½, 10½, 11 and 11½ ft. in the two, three, four and six-ton cars respectively. In the



Showing the Oil Pan Removed; Double Plunger Oil Pump at the Center

standard platform, length is 8, 10½, 11½, 12½ and 13 ft. in the one, two, three, four and six-ton cars respectively. When so desired, a long chassis is to be had, that shown in the illustrations being one of this sort. The one-ton car in this equipment is 9 ft. 9 in., two-ton 12 ft. 3 in., three-ton 13½ ft., four-ton 14½ ft., while the six-ton platform is 15 ft.

Maximum speed is 18 m.p.h. for the small car on solid tires, 25 m.p.h. if equipped with pneumatics; 15 m.p.h. for the two-ton and 12, 10 and 8 m.p.h. for the three, four and six-ton vehicles respectively. Tread in the one-ton car is 56 in., two-ton 60 in., three-ton 64 in., four-ton 68 in., six-ton 70 in. Wheel base is 120 in. in the short series for the one-ton, 125 in. for the two-ton, 135 in. for the three-ton, 140 in. for the four-ton, and 145 in. for the six-ton; standard wheel base for the same models being, in order, 130, 140, 150, 155, 165 in.; while the long chassis wheel base, in the same order, is 150, 160, 170, 180 and 190 in. Weight of standard chassis is 3000 lbs. in the one-ton car, 4000 lbs. in the two-ton, 5000 lbs. in the three-ton, 6000 lbs. in the four-ton, and 7000 lbs. in the largest car.

Stephenson Double Friction-Drive Commercial Cars



DDOUBLE friction drive is the chief feature of the 1912 Stephenson commercial cars, manufactured by the Stephenson Motor Car Company at South Milwaukee, Wis. This form of transmission has been used in previous models with good success, so it is claimed. Stephenson cars are to be had in two types; namely, Type B and C, both of which follow similar lines of construction, the former being the smaller car and rated at one ton carrying capacity, the latter the three-ton model.

Double Friction Transmission

Since the Stephenson cars differ from others of the friction-transmission type in that the form of drive is double, let the transmission be first considered here.

The details of this double friction drive are well set forth in the accompanying illustration. Note that the usual engine flywheel is dispensed with, and in its place the two friction discs are looked to to provide that desired inertia ordinarily attained through the use of the flywheel. The

eccentric action, there being four of these eccentrics, which may be noted on the cross shafts above the front friction disc. The friction wheels are moved along the shaft by means of the usual side hand lever, the left-hand wheel forming the contact with the front disc, the right-hand with the rear. The two wheels must obviously travel in the same path of rotation, the left wheel being turned as the front disc travels downward, the right as the rear disc travels upwards. Reverse is had by simply changing the relation of one member to the other.

Final drive is through side roller chains, $\frac{3}{4} \times \frac{3}{4} \times 1\frac{1}{4}$ in. pitch. In the cut of the front sprockets it will be noted that there is a large housing which encloses double reduction gears, the small gear moving with the shaft, the big gear supported in a roller bearing, so that movement of the shaft which is essential in the double system, is cared for. Drive



Stephenson Double Friction-Drive Commercial Car, Type B. Body is 108 inches long, width optional. Price, \$2000

assembly is supported on cross members of the frame and is reached by raising the floor boards of the body. The idea is simply this: two wheels are considered better to deliver the engine effort than one, which sounds reasonable, and, from all appearances, no complication results from the use of the two discs and two wheels. As in all friction transmissions, the wheels are advanced or brought back across the faces of the discs at the same time; that is, each friction wheel forms a contact on the face of its individual disc. Better balance is one thing claimed for this construction. The connection between the motor crank shaft and the friction assembly is a forged shaft on which the two friction discs are mounted, these discs, let it be understood, serving as the flywheel. This shaft, in the three-ton car, is $2\frac{1}{4}$ in. in diameter. The two friction wheels are 28 in. in diameter, $1\frac{1}{4}$ in. face, the friction discs 23 in. in diameter; the wheels having eight spokes, the facing being fiber, retained through rings and bolts and thoroughly "run in" before installation. All shafts are supported on large roller bearings. The wheels are brought in contact with the discs through

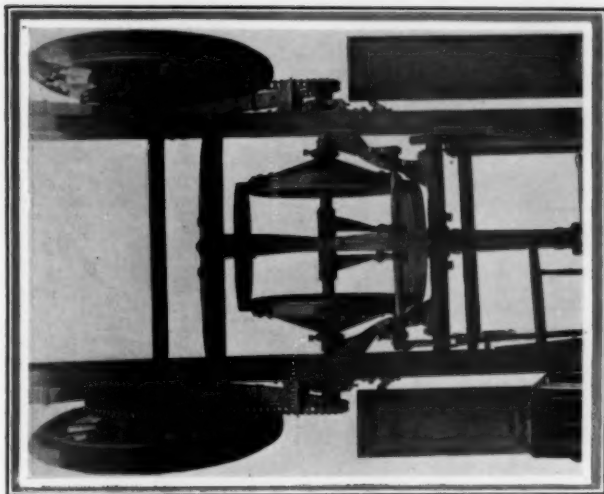
is not therefore direct, but is reduced. The sprocket is secured to the large gear. What strain is developed in the system is distributed by a center equalizing bearing, so that there is no end thrust. Each friction disc drives its own road wheel, so that either wheel may pull the entire load independent of its mate, should there be such necessity.

Operation has been described above, the friction wheels being moved on the ground jack shafts by the hand lever, contact finally made through a foot pedal, reverse effected by another pedal.

Four-Cylinder Motors

Engines of the four-cylinder type in the Type B and C Stephenson cars are identical in construction, save that in the three-ton vehicle the unit is a little larger. Both are of the T-head type, which makes for good balance.

The cylinders are cast in pairs with the water jackets integral, though the jackets are open at the top and closed in with metal plates. A close gray iron is used for the cylinders, and the valves are amply provided in the jacketing system.

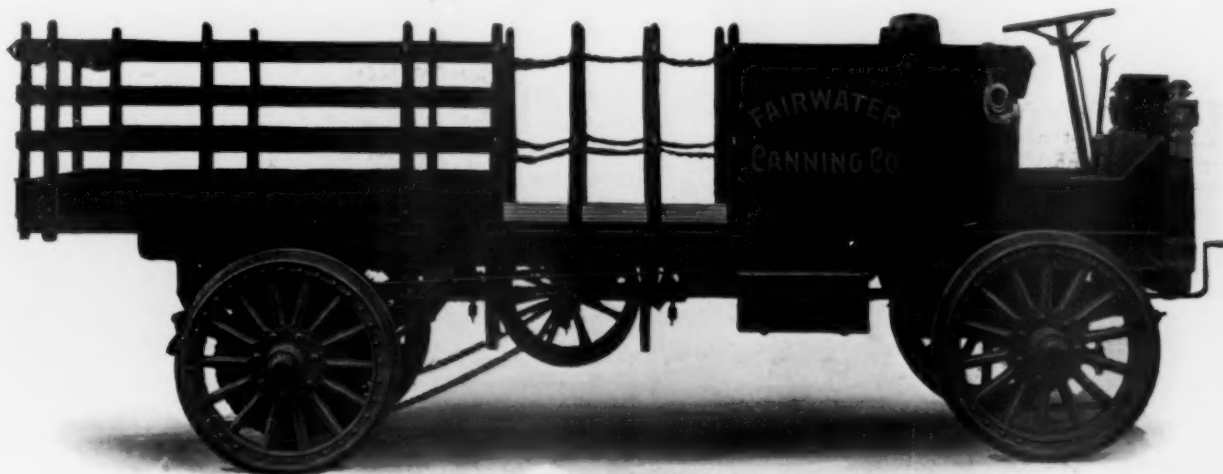


Plan View of the Stephenson Double Friction Drive. This view shows the double friction discs and the manner in which the assembly is supported

through gears and vertical shaft. The oil is led from the pump through a lead to a main duct cast integral with the upper section of the crank case and from here passes to the main bearings. The crank shaft is drilled so that the oil eventually is delivered to the connecting-rod bearings. Contrary to the usual practice, the connecting rods do not dip in oil, as sufficient lubricant is tossed by the rods to fully care for the cylinder walls and the like. With this system a constant stream is being delivered to the bearings. An oil gage extending to the level of the supporting arms and located on the exhaust side indicates the height of oil by means of a ball float, the high and low oil levels being indicated on the gage.

Cooling

Cooling is by water, as before noted, the cylinder jackets caring for the valves and the like. The water pump is bronze and located on the left side of the motor, the water entering the under side of the jackets and passing out through the polished bronze dome plates, then back to the cooler.



Stephenson Double Friction-Drive Commercial Car, Type C. Body is of the platform and stake-body type; length 168 inches, width optional. Price, \$3500

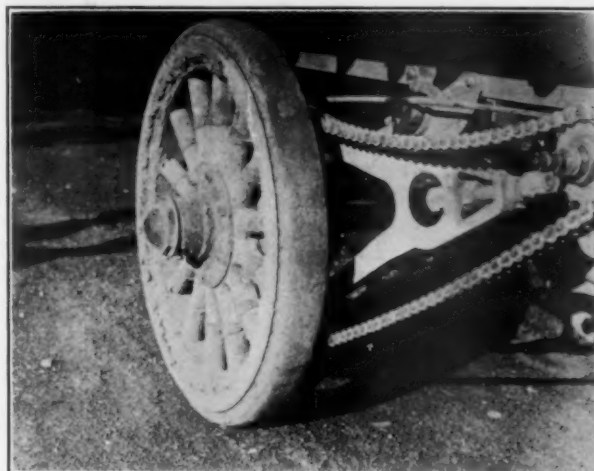
The crank shaft of the large motor is 2 in. in diameter and is formed the same as that used in the small engine, forty per cent carbon steel being used. The main bearings are Parson's white bronze, grooved for oil. All other bearings throughout the motor are phosphor-bronze. Crank and connecting-rod bearings are fitted with shims, main members supported in the upper section of the crank case.

Pistons are of the usual order and are fitted with four semisteel rings carried above the wrist pin, which is itself hollow, hardened and ground and anchored in the connecting rod through a pinch bolt.

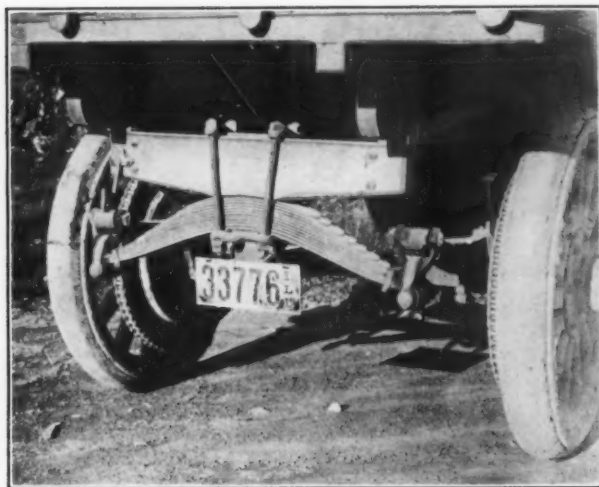
The crank case is made in two sections, of aluminum, motor bearings supported in the upper portion, reinforced by cross ribs, the four supporting lugs formed integral with the case. The motor gears are enclosed in an oiltight compartment.

Lubrication

Stephenson four-cylinder motors are oiled through a self-contained system, the oil pumped from the oil pocket in the bottom of the crank case by a gear pump driven from the exhaust cam shaft



Stephenson Double Friction-Drive Truck; showing rear wheel and radius rod assembly



Stephenson Platform Spring. Note method of fastening spring to cross bar

Ignition

A high-tension system of ignition is employed, source of current a magneto, Bosch type, located on the right side forward and driven off the half-time gears. The spark plugs are screwed into the inlet valve caps.

Frame

In the three-ton car a 6 in. channel frame is used; in the one-ton vehicle a 4 in. channel frame; either of which is reinforced by the usual cross members, jig-assembled, drilled, and hot-riveted throughout.

Springs

Front springs of the three-ton car are semi-elliptic, 40 x 3 in., and built up of ten graded ribbed leaves. Spring clips are drop forged, spring plates cast steel, clip diameter $\frac{3}{4}$ in., these set at an angle.

The rear springs of the three-ton car are three-quarter platform type, the cross member having twelve plates, center ribbed; overall length 40 in., width 3 in., anchorage, as shown, being to a wood cross piece which is firmly secured to the side rails of the main frame. The side springs of the rear set are of thirteen leaves and 44 x 3 in.

Axles

Front and rear axles are drop-forged steel, $2\frac{1}{2}$ x $3\frac{1}{2}$ in. front, a center-dropped affair with integral steering jaws. The rear axle is $2\frac{3}{4}$ in. square. Wheel base is 136 in. in Type C, three-ton car; tread 60 in.

Wheel base in the small car is 110 in., tread 56 in.

Tires are 42 x 5 in. solid rubber on the three-ton car, 40 x $3\frac{1}{2}$ in. flange type on the one-ton car. Clearance is $11\frac{1}{2}$ in. in the one-ton car, $12\frac{1}{2}$ in. in the three-ton car.

Brakes

There are two sets of brakes, so to speak, the rear wheel members and the friction reverse. The Type C brakes are

internal expanding in the rear wheels, cast-steel drums 20 x 4 in., worked in the usual manner. The sprocket rings are bolted to these rear brake drums, the drums being clipped to each of the wheel spokes. One-ton car rear brakes are also internal expanding and are $17\frac{1}{4}$ x $2\frac{1}{2}$ in. face.

Steering

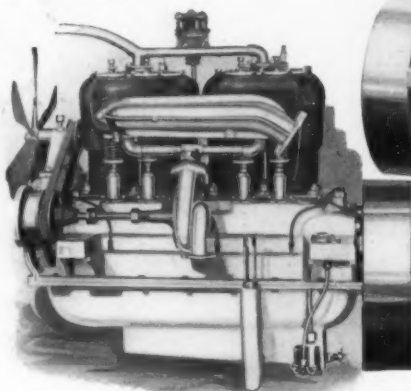
A screw type of steering gear is used in the three-ton truck, the rods carried in front of the axle, these $1\frac{1}{4}$ in. in diameter, fitted with adjustable yokes, drag link having ball and socket joint. The steering post is $1\frac{1}{4}$ in. in diameter, wheel 22 in., control rods $\frac{3}{4}$ in., located on a quadrant under the steering wheel. The smaller car is fitted with a gear and segment system, the hand wheel being 18 in. diameter.

Control

Steering is from the right and the spark and throttle are worked from the steering post quadrant. The wheel post is tilted back sufficiently to make for an easy position for the operator. Radius rods care for brake stress.

Carburetor

The carburetor is a Stromberg instrument and is located on the right side of the engine about the middle of the crank case. The intake is of conventional design, held on the cylinders through steel studs. The exhaust is cast iron and is gradually tapered, held on the cylinders through steel studs and lock washers.



Left and Right Sides of the Stephenson Motor. The lower view shows the exhaust side, the other the intake side.

Bodies

Type B body is 108 in. long, and the width is optional. About any type of body is to be had on order, the final cost of the car depending much on this equipment. The three-ton body is 168 in. long and the width here is also optional. Price of the Type B car is \$2000, Type C \$3500, f.o.b. Milwaukee, Wis.



Close View of the Stephenson Jack Shaft Driving Sprocket; showing also forward end of radius rod, and its support

The Importance of Trailers and Road Trains

Some Examples of Their Use Here and Abroad

BY E. S. FOLJAMBE



ALTHOUGH trailers have not come into any general use as yet in this country, it is but a question of time when the very decided advantages accruing from their use for special work and where conditions of service are suitable, will undoubtedly cause them to be adopted.

It is not always necessary that a purchaser buy a five-ton truck, even though five tons of material must

generally adopted abroad, and why so few are used in this country, may well be looked for in the condition of the roads; also on account of the more settled communities which are found in Europe, with only slight stretches of comparatively unpopulated land between. Long, slow-moving road trains can travel economically from one small town to another, transporting merchandise. In this country there are no such conditions, the cities and villages being quite widely separated.

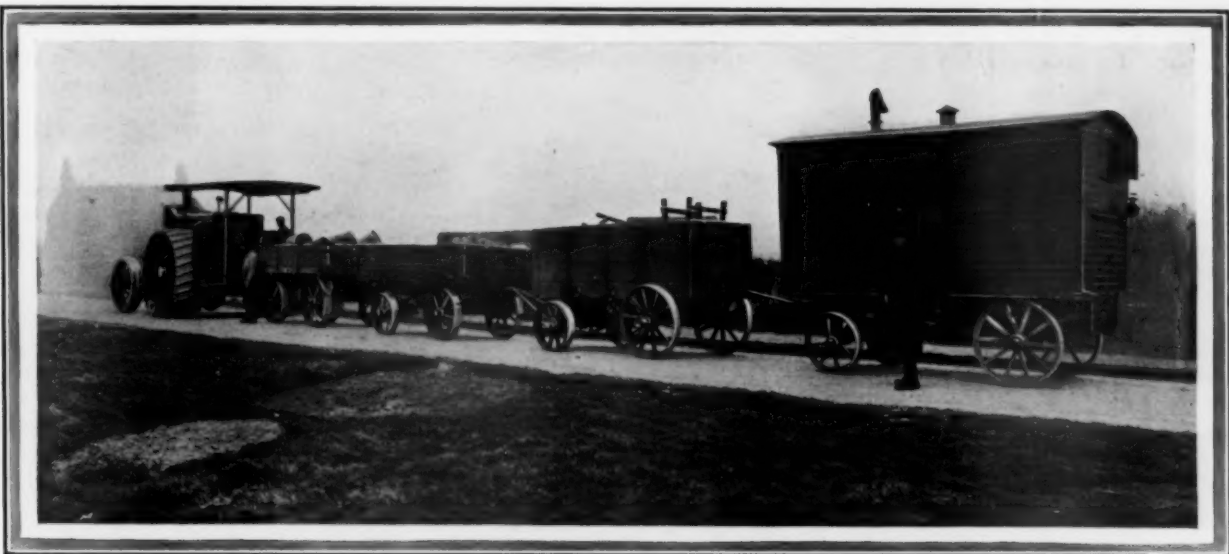


Photo by courtesy of Motor Traction

Marshall "Colonial" Tractor Hauling Four Heavily Loaded Trailers. These trailers are capable of burning kerosene, the largest ones developing 70 h.p. The maximum speed is $3\frac{1}{2}$ miles per hour

be moved daily. In fact, it is often a waste of good money to purchase such a large-sized unit when the conditions will permit of the use of a three-ton truck and a two-ton trailer. In addition the three-ton truck can often be used to advantage for hauling smaller loads while the trailer is either idle or being loaded. For small loads a five-ton truck would not only be unsuitable, but a wasteful means of transporting the goods.

Why Road Trains Are Common Abroad

The reasons why trailers and road trains have been so

The fact that the country roads in Europe are usually macadam and in fine condition as compared to our own, makes possible the use of tractors with several trailers and

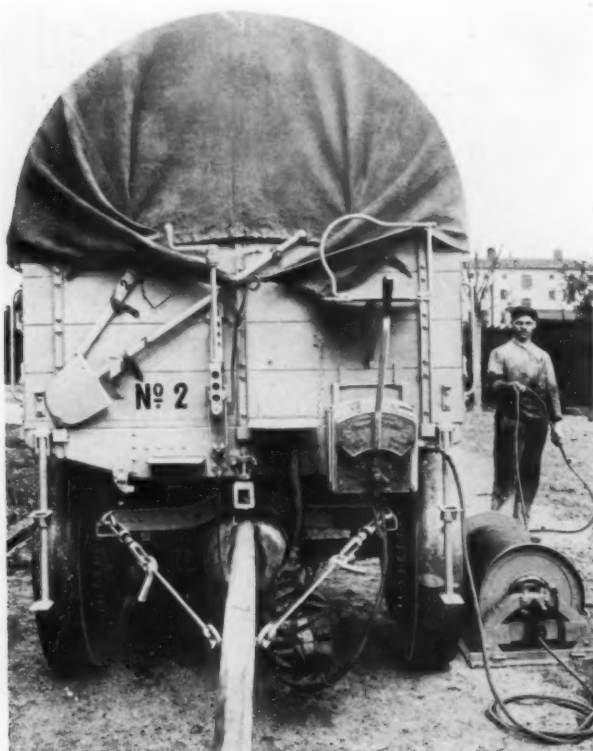
loads aggregating thirty or forty tons. Such a train, of course, would be out of the question over some of the almost impassable roads of this country. In the accompanying illustration is shown a Marshall "Colonial" Oil Tractor, hauling such a road train, consisting of four trailers. The maximum speed allowable is $3\frac{1}{2}$ m.p.h. These tractors are fitted with two or four-cylinder motors of 7 in. bore and



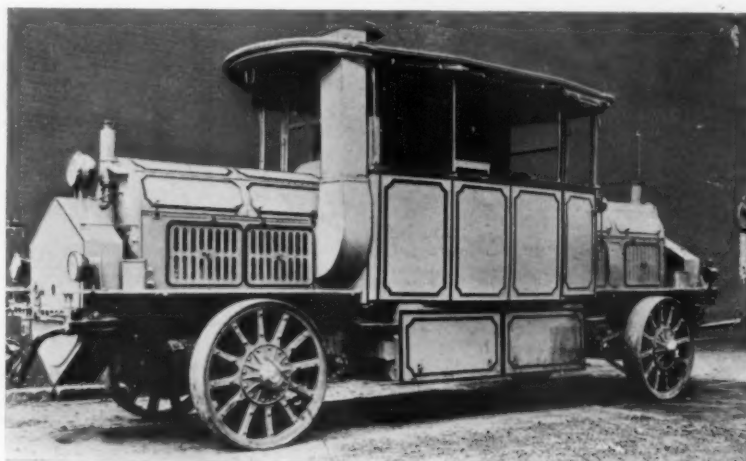
Photo by courtesy of Motor Traction

Daimler Road Train Loading Up With Mail Bags at Bombay Docks. This road train was shown to be capable of transporting the mails in very much less time and at less expense than the old-established method of using bullock carts. The loading and unloading is done by a large number of coolies, who carry the bags on their heads.

7 in. stroke, and are capable of developing 30-35 and 60-70 h.p., respectively. The larger machine is capable of pulling a twelve-furrow gang plow, cutting to a depth of about 5 in. in the soil. The front axle is flexibly mounted at the center for negotiating rough ground. Each machine is fitted with a winding drum and fifty yards of $\frac{3}{8}$ in. wire rope; this drum is on the rear axle and can be used for many purposes. The engines are arranged to use kerosene, a special vaporizer being supplied if desired. The driving wheels are entirely of steel, with the exception of the hubs, which are cast of cylinder iron. It will be noticed that the entire train is on iron tires. Under test this machine climbed an incline of soft ground of 1 in $3\frac{1}{2}$, or a grade of about 28 $\frac{1}{2}$ per cent., and afterwards, by means of the cable and drum, wound up three trailer wagons over the same grade, showing the possibilities of such an outfit.



Front of a Muller Trailer. This view shows the electric cable drum used for train-forming operations. When not in use this is carried underneath the body.

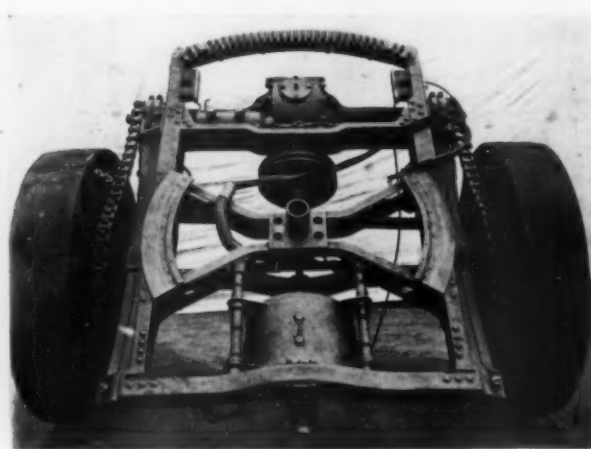


Generating Car of Muller Road Train. This is not, strictly speaking, a tractor, but can be placed in the middle of the train or at either end, the train steering from the cab equally well in either direction. An engine at each end, totaling 180 h.p., operates generators at the center, supplying current to motors on the axles of the trailers.

The Daimler Road Train in India

Even in far off India, which many of us are inclined to think is not yet sufficiently modernized to have such things as road trains, we find His Majesty's mails being carried by road trains from the steamers to the Bombay general post office, and also transporting bales of cotton to the docks. It must be remembered that this most up-to-date method, at once and without intermediate steps, supersedes the bullock cars which have hitherto been very extensively employed in India. The photograph here shown by courtesy of *Motor Traction*, of London, was taken in December, and shows the Daimler road train just after being loaded up at the

Bombay docks. In this particular instance, the mail steamer was late in arriving, but owing to the road train being used, the up-country railway train's departure was not delayed, as would have been the case had the bullocks been used. Two journeys to Victor Station were made, the distance being 1.4 miles, the average speed with a load of 487 mail bags, or about 14 $\frac{1}{2}$ tons, was 8.4 m.p.h.; so that the time between the train and the station was only about ten minutes. The train was in use about one hour and forty-five minutes; the rest of the time it was standing still, being loaded or unloaded; 17 $\frac{1}{2}$ miles were covered in the various short trips and a total weight of 104 tons was transported, consisting of almost two thousand bags or boxes. The gasoline consumed was 1.9 gallons per train mile, or about 53.67 gross ton miles per gallon were ob-



Bogie Truck Muller Train. An arrangement similar to a jack shaft is employed, and drive is then by side chains. Each bogie carries its own motor.



Photo by courtesy of Motor Traction

Alden Sampson Road Train; showing how a short turn can be made. The wagons track each other

tained. Forty-nine bullock carts would have been necessary to transport the same amount of merchandise as carried by this single train. The greatest number of mail bags taken at any one load was 525, as against twenty for the largest bullock load.

Muller Road Train

Herr W. A. Th. Muller, of Berlin-Steglitz, a well-known German electrical engineer, has combined the electric railway principle with the motor truck to make the Muller Road Train.

His idea was to do away with a very heavy tractor, by having each of the cars fitted with electric motors, supplied with current from the tractor. The tractor, or engine car, as it is called abroad, is herewith illustrated. It is equipped with a gasoline motor at each end. These drive two electric generators at the center to furnish current to the trailers. Up to ten wagons may thus be coupled in a train, each wheel axle being provided with a driving gear connected with its own motor.

These trains are primarily designed as a



A Record Haul. A five-ton Sampson truck transporting 17,214 pounds for the American Radiator Company, Kansas City



Avery Truck With Loaded Trailer. The tractor is carrying a load of rice, as is also the trailer. This same machine has been used for plowing the rice fields, traveling over ground which had been plowed in the Fall with two disc plows, and covered sixteen acres between four o'clock in the afternoon and dark.

means of communication from railway heads to places out of reach of the railways, but are used for many purposes. The Prussian Army, for instance, ordered a train of this type with a capacity of twenty-seven tons, corresponding to that of a victualing column, for military use.

The possibility of using the generating car as a secondary source of energy, while the vehicles are not actually in operation on the road, is a further advantage of this type.

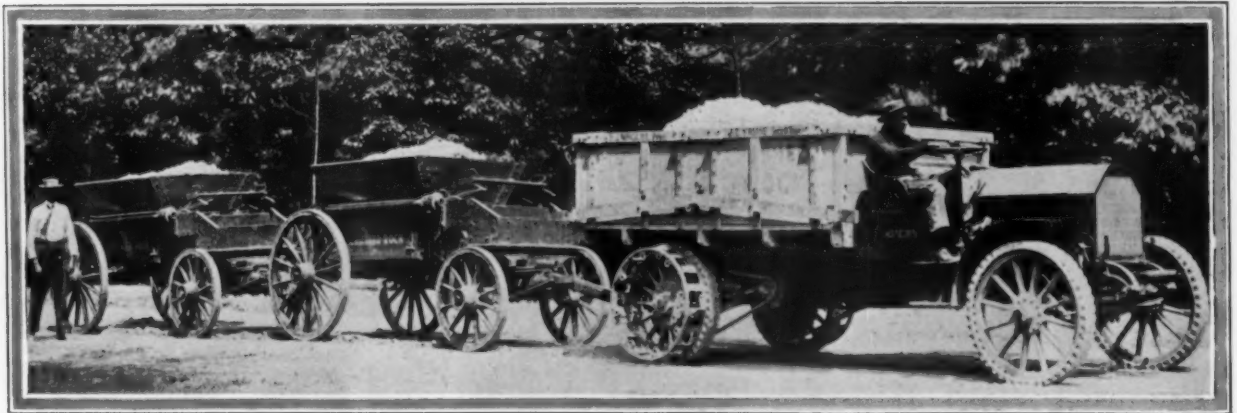
The two motors total about 150 to 180 h.p. and may be operated singly or simultaneously, according to the length of train, and road conditions. Current is carried through a substantial cable, which can be quickly uncoupled between any two wagons. The dynamo

controls allow the distribution of the current to the motors on the various trailer wagons to be controlled from zero to a maximum in an infinite number of gradations.

The frame of each of the vehicles is supported at either end on a bogie axle, each of these two-wheel bogies carries an electric motor and driving gear, the drive being taken through shafts and differential gears of the ordinary pattern, and to the wheels by chains and sprockets. The cars can travel equally well in either direction, the driver's cabin being equipped with double steering arrangements.

Mechanical couplings between the cars cause the vehicles to track the engine car. By reversing the steering chains the whole train may be steered backwards. If desired, the engine can be located at the front or the middle of the train and the driver can operate the entire train without assistance.

Starting and speed alterations may be effected by shunt regulator connections with the generator, and all brakes are electrically operated. The cars are also provided with a



Tractor Hauling Stone. The Avery tractor as used by one stone company to facilitate its work

hand brake which acts on all four wheels, and extra brakes, compressed air or electrically operated, are supplied for mountain work.

For train-forming operations, a flexible cable is provided, which allows the detached trailers to be operated within a radius of one thousand feet. This electric cable drum is shown in an accompanying figure illustration, on the ground beside one of the trailers. When not in use it is carried under the wagon.

Alden Sampson Road Train

There is practically but one road train manufactured in

operated by motors furnished with current and controlled from the fore car. The train is here shown carrying a load of twenty tons of rocks.

It often happens that an ordinary wagon can be pressed into service and so connected to a commercial car as to serve as an efficient trailer. Many of such instances are on record, and undoubtedly there will be many more such cases in the near future. In an accompanying illustration is shown a five-ton Sampson truck carrying goods of the American Radiator Company, in Kansas City. A wagon was used at the rear loaded with castings, the combined load being 17,214 lbs. A trip was made with this load from Kansas City to Centropolis, over very hilly country, a distance of seven miles. The entire trip was accomplished in one hour and fifteen minutes, the truck easily handling this enormous load.

There are many other examples of use of ordinary wagons as trailers, and in every case considerable saving is shown over former methods and over the use of two trucks or one larger one. In the accompanying photograph is shown a case of this kind, where grain was



Rapid Truck With Two-Wheeled Trailer. This machine is used by the Michigan State Telephone Company. The outfit is known as the Flying Squadron. They set up and remove an average of three hundred poles per month, besides other work.

this country, that by the Alden Sampson Manufacturing Company, of Pittsfield, Mass., and Detroit, Mich. This train is of the gasoline-electric type and is arranged so that each of the trailers is automatically steered, so that they track the fore car. The train is capable of taking a very short turn, which is clearly shown in the accompanying photograph. Each of the vehicles has six wheels, the center wheels being very large drivers



Couple Gear With Trailer on Runners. The couple-gear truck here shown is in use daily, winter included, by the Pratts Express Company, of Minneapolis and St. Paul, cities where there is plenty of snowfall. The total load carried is six tons, not including the weight of either vehicle, each carrying three tons. Attention is called to the cab, completely housing in the driver.

hauled economically, one of the small horse wagons being used as trailer. By this means, a seven-ton load is easily carried by a five-ton truck and the wagon, with very little additional expense over that of hauling the five tons alone. Where many trips a day are made, this means a large increase in quantity of goods moved with a very slight increase in the cost.



Truck and Trailer in Army Service. The entire camping outfit of Battery E, Minnesota State Artillery, was moved from Fort Snelling to Minneapolis in less than an hour. The fact that there was no kicking was not alone due to the absence of the proverbial army mule.

There are a few firms making use of trailers in this country and each year the number increases. In the following paragraph a few examples of commercial haulage are mentioned and the machines illustrated.

The Avery tractor is herewith illustrated as used by Adams & McKibben, of Stuttgart, Ark. They state that this was the first machine of this kind in their community, and that they could easily haul a load of rice weighing 11,900 lbs. to its destination, nine miles, in one hour and ten minutes, while using a trailer. They also use it for hauling disc plows over rough ground in the rice fields, and report that they are able to plow a very large field in the same time, and that the work is more satisfactorily done. On one test, they plowed a fraction over sixteen acres between four o'clock in the afternoon and dark. This company feels that no farm is complete without a tractor.

In another illustration is shown an Avery tractor hauling a load of stone and drawing two fully loaded dump wagons. There is a net load of 7680 lbs. on the tractor, 5430 lbs. on the first trailer and 5450 lbs. on the second trailer.

The peculiar paddle-wheel-like attachment to the rear wheels is to give additional traction on soft ground. The tires consist of hardwood plugs presenting their ends to the ground.

Telephone Company Makes Use of Trailer

The long poles which have to be handled by the Michigan State Telephone Company are now moved by means of a Rapid truck, behind which a two-wheeled trailer is employed to support the rear ends of the poles. The crossed bars, poles, and crew of nine men, ride in the truck, and the forward end of the poles are supported by the rear of the truck, where they are swung on chains. The outfit is known

as the Flying Squadron, and is capable of setting and removing an average of three hundred poles a month, besides handling considerable other miscellaneous work which has been found too heavy for the horse trucks. In addition to the nine men and the necessary equipment, the load on the trailer itself is over a ton and a half. This Flying Squadron takes care of all the new parts that are placed within a radius of forty or fifty miles of Detroit, and is another striking adaptation of commercial cars.

Recently a camping outfit of Battery E of the Minnesota State Artillery had to be moved from Fort Snelling to Minneapolis to take part in the civic celebration. Instead of using the time-honored army mule, the complete camping outfit, making a load weighing over three tons, and consisting of tents, poles, beds, etc., were packed onto a Peerless truck. To the rear was attached an ordinary two-horse wagon with another half ton of the equipment. The entire outfit, in spite of soft roads and the fact that part of the distance was over turf, was moved in one hour. The entire performance was so far ahead of what could have been done by any other known method that the officers and troops were highly delighted.

Another example of the service which can be rendered in emergency, or, for that matter, in daily service, by the use of a trailer, is that of a haul made by the American Radiator Company's Kansas City office. By means of an ordinary wagon as trailer and a Sampson five-ton truck, as shown in the accompanying photograph, 17,214 lbs. were transported over a hilly country between Kansas City and Centropolis, a distance of seven miles, in one hour and fifteen minutes.

Another Sampson truck is herewith illustrated, hauling a mighty load of grain for the F. E. Ransom Coal and Grain Company. In this instance again, an ordinary wagon was used as a trailer. Such performances are, however, looked upon in this country more or less in the nature of "stunts;" but the time is coming, at no distant date, when the use of



Photo by courtesy of Motor Traction
Hauling Grain With Truck and Trailer; showing how an ordinary wagon can be used to advantage as a trailer

such trailers, even when ordinary wagons are used arranged with suitable connections, will simply be looked upon as an ordinary occurrence.

A Motor Truck Which Actually Supplants the Railroad as a Hauler of Freight

BY CHARLES M. SMYTH



WHILE it is a known fact that motor trucks are accomplishing some very remarkable results in "delivering the goods" around and about our cities, it is not so generally known that in some instances trucks are competing successfully with railroads in hauling freight from town to town.

One of such cases which is worthy of mention is that of the Colorado Condensed Milk Company, located at Fort Lupton, Col., twenty-six miles North of Denver. The firm had not been in business very long when that por-

into the freight car on the siding at Fort Lupton; from the freight car onto the platform of the freight depot at Denver; from there again onto a dray, and from the dray into the places of business of the retailers—a method of transportation not unusual in the handling of freight by railroads, nevertheless discouraging when considering the short distance to be covered in this case.

Gilbert Landell, the manager of the condensed milk company, decided to try hauling the product into Denver by wagon. As it was only a twenty-six-mile haul, it would



As the Truck Arrives in Denver With its Load of Milk

The Route of the "Fort Lupton Express" Follows the Tracks of the Burlington for Several Miles

The Reliance Truck With Top, Recently Put on For Winter Service

tion of its output intended for Denver trade became a problem to handle. It began to receive inquiries from patrons why a consignment when ordered could not be delivered promptly, and complaints were not a few. The matter was taken up with the railroads handling its product, with a reply that about all possible was being done in the way of speed. Yet, it was taking just about the same length of time to place an order in the hands of a dealer in Denver as it did for one in Omaha—a difference of some six hundred miles.

While only about an hour's run from Fort Lupton to Denver, after the loaded freight car once got under way, the trouble seemed to lie mostly in the fact that much time was lost by the cars standing at either end of the line, and especially in the Denver freight yards. Then there was the matter of handling an order so many times before it reached the retailer: from the factory onto a dray; from the dray

nevertheless take considerably longer time on the road, but would eliminate the several handlings and other delays, and would undoubtedly save time on the whole operation.

But the wagon roads were bad—hilly in places and with much fine, loose sand and heavy gravel. It taxed a six-horse team to haul two and a half tons under the more favorable conditions of the haul. The outfit was able to make only two round trips a week—leaving Fort Lupton at midnight and arriving in Denver the following afternoon. To handle the amount of business Denverward, it was necessary to put on two outfits, and as the teamster was obliged to keep extra horses in reserve for emergencies, it required the feeding of some fifteen or eighteen horses to maintain the service. The teamster was barely able to break even on his expenses at sixteen cents a hundred. It was costly indeed to the milk company, but they were enabled to deliver their product more quickly, with the result that their

patrons were far better satisfied and their business promptly began to increase.

Then came the idea of an improvement in the service by installing a motor truck. Several demonstrations were made for them by truck salesmen. A three-ton Reliance truck was finally settled upon, because of an opportunity to purchase a secondhand one, but little used, at a good reduction. They paid twenty-five hundred dollars for a thirty-five hundred dollar truck and put it into service, and then their troubles began. First it was tire trouble—the loose sand and gravel ripping off those that came with the truck, in short order. Others were tried, with little better result. Finally, when they got a tire they believed would hold, their engine, which had been balking, gave out, and it was necessary to discard it and try another make. Several makes were tried, and before long it began to look as though the motor truck, in this particular instance, was destined to become a failure. Up to this point they had been unable to discard their horse haulage and expenses were heart-breaking.

But the possibilities were plainly seen by all parties concerned, and dogged determination on the part of Ed Cuppage, the driver in charge, and the leniency of the management finally won out. A 40 h.p. four-cylinder two-cycle Continental engine, Model J, with a Packard transmission, was installed, which cost them four hundred dollars extra.

The truck has gotten down to a regular schedule, averaging sixty miles a day, and is familiarly known as the "Fort Lupton Express." It leaves that place at 7 a.m., arriving in Denver at 9 or 9.30, going direct to their patrons' places of business and unloading in less than three hours after leaving the factory. It has no trouble in hauling three full tons, and occasionally makes two round trips a day. On the down trip it handles nothing but their Columbia brand of condensed milk, but returning, never goes back empty-handed.

They charge up what it carries at fourteen cents a hundred pounds (same as the railroad charge), and counting only twenty-six trips a month, it will consequently save them \$218 on their product alone. They have no trouble at all keeping orders ahead of the capacity of the truck on the return trip for various merchants of Fort Lupton. Once the municipality of that place purchased a sprinkling wagon in Denver, which was handled between the two places by the Reliance truck and afterwards filled and towed about the town in the same manner, sprinkling the streets for the first time.

The custom freight it hauls results in an actual cash income of some two hundred dollars, and this added to what it saves on their own product will total easily four hundred

dollars a month, which can be placed upon the credit column of the truck account.

Now for the debit side of the account. The driver's salary is seventy-five dollars a month. The machine consumes twenty-eight dollars worth of gasoline and three dollars worth of Polarine lubricating oil in a month. The repair expenses for that length of time amount to twenty dollars and the tire wear averages around seventy-five dollars—making the total sum of two hundred dollars to be charged against the truck.

But the truck is earning two hundred dollars actual cash in custom freight hauling, not considering what it is saving on their own product. It wipes the cost of handling the product for the Denver trade entirely off the company's books and pays its own maintenance expense. The only actual cost to the company is the interest upon the investment and the depreciation of the truck. But as this investment was made by the company with the sole expectation of improving a condition that its Denver patrons were complaining about, it is gratifying indeed to note that the truck has easily accomplished the intended result, and proven itself a profit earner besides.

COMMERCIAL CARS ON PACIFIC COAST

The rapid growth of the truck end of the motor car industry in California continues to excite the wonder of the dealers in that State. At present practically all of the well-known commercial vehicles made in this country are represented there and all are having good sales. The most serious drawback of the local agents is that of not getting enough machines. As the choice of early deliveries naturally goes to the agents near the factories, the distributors on the Pacific Coast are unable to have their orders filled as expeditiously as they would desire. It is expected, however, that this difficulty will be obviated soon, for the Eastern manufacturers are realizing the extent of the Western trade and will do their utmost to foster its growth in the future.

A movement is under way to construct an auto truck road from Rogue River Valley, Ore., to Crescent City, Cal., a distance of approximately one hundred miles. As Crescent City is midway between Portland and San Francisco, with adequate harbor facilities, it is estimated that freight can be hauled to tidewater by auto trucks from the interior valleys, then transported by water at a much cheaper rate than the prevailing railroad charges. Motor truck enthusiasts are boosting the project.

THE DETROIT TAXICAB AND TRANSFER COMPANY has installed ten two-ton Kelley commercial cars, which will be used in the general transfer business in Detroit and surrounding towns.



Impressions of European Manufacturing and Operating Methods as Applied to Commercial Vehicles*



WHILE this paper is ostensibly devoted to commercial car practice, it will probably be of interest to the members to give a brief review of the principal impressions gained at Olympia.

In the first place, this show was given over entirely to pleasure cars and accessories; there seems to be no demand for a commercial car show, or if there is, the manufacturers are not inclined to respond.

In some details there was greater divergence of ideas shown in the design of the models on exhibition than has been apparent at our own shows for the past two or three years. In others, there seemed to be a well-defined unanimity of opinion.

In the first class were such features as enclosing the valve springs and cam followers, casting the cylinders en bloc, thermosyphon cooling systems, subcrankcase oiling, four-speed transmissions with selective control, service brake at the rear of the transmission, three-quarter elliptic rear springs, and demountable wire wheels.

In the latter class were the following: First, cam-shaft drive—at this point there is a fairly even division between spur gears and silent chain, and one maker used worm gears. Second, the increasing number of models equipped with sleeves or rotary valves. The most prominent of these is the Knight motor, which is being used by three or four English makers and three prominent Continental firms.

In addition to this, there were three other motors on exhibition. Probably the one which showed the greatest promise was the Argyll motor, in which a single sleeve, to which is imparted a combined rotary and reciprocating motion, acts as the valve. On the surface this arrangement seems to offer some advantages over the Knight motor, inasmuch as it eliminates one sleeve with the attendant difficulties in construction which the latter design presents.

The next which deserves mention is the new Itals motor, in which a single rotary valve is placed in a vertical position between each cylinder pair, and contains parts which alternately index with a single port in each cylinder. By this it will be seen that the same cylinder port serves both for inlet and exhaust, the connection to the proper passages being made by means of the valve. The valve is cored for the passage of water through it, and means are provided to balance the valve against explosion pressure.

In addition, there was the Darracq, which had a rotary valve in a horizontal position at the upper side of the cylinder, which alternately connected the cylinder with the inlet and exhaust passages; and the Hewitt motor, which replaced the poppet valve with pistons.

The silent-chain transmission was shown in one model, but its advantage seemed to be of doubtful value. In the first place, it makes a more bulky unit and one which weighs more and costs more to build. Secondly, the prime cause of trouble in any slide-gear transmission is the burring of the teeth in changing gears, and this element has not been removed, although its effects may be lessened by the small diameter of the engaging elements and the greater elasticity of the chain.

The worm-gear final drive was exhibited by a number of makers, and makes a very pleasing construction.

The surprising feature is that there is considerable variation in opinions as to the value of this feature, tending to show that

the spiral gear as a final drive for automobiles is still an uncertain quantity and subject to a good deal of study before it will prove itself capable of superseding the bevel gear.

There were a number of cars in which the radius rod had been eliminated and the drive taken through the springs, and in some instances the torque rod was also eliminated.

Another point of interest is the tendency toward motors of small bore and long stroke. This is due to the system of taxation and the efforts of the manufacturer to obtain the maximum power with a motor which is subject to the lowest possible tax. This, in addition to the general inflexibility of English motors, has created the demand for four-speed transmissions.

Now, relative to commercial cars, the following description of the cars made by the London General Omnibus Company is indicative of general design, inasmuch as these people are making cars for their own needs after operating several different models of prominent make, which embody the good points and eliminate the bad ones shown by their experience with these cars.

The car weighs 8064 lbs., and carries thirty-six people, including crew of two men. The motor is 4½ in. bore by 4½ in. stroke, four cylinders, cast in pairs, tee-head with mechanism enclosed. Subcrankcase oil is provided, aluminum pans under each connecting rod being kept filled at a constant level by a gear pump. Connecting rod and crank bearings are Babbitt-lined bronze. The piston pins are retained and held from turning by a piston ring. The cylinders are not baffled. Ignition is effected by a single Bosch magneto with fixed spark. The magneto is enclosed in an aluminum case provided with a padlock.

Most of the cars are equipped with Solex carburetors. Thermosyphon cooling system is used, and the car seems to overheat more than it ought. The radiator is composed of an aluminum head and base, with tubes connecting the two. There are no fins on the tubes. The clutch is of the reverse cone type, being brought into engagement by a flat spring, the ends of which are seated on the flywheel face. A clutch brake is provided, being composed of leather-faced disc on the clutch shaft, with which a spring arm having about 180 degrees segment comes into contact.

The transmission is three speeds forward and one reverse, of the silent-chain type. Shafts and gears are mounted on Hoffman ball bearings. The main shaft has six integral keys, and the sliding gears are ground on the inside diameter to fit the shaft. These transmissions have run eighteen months without overhauling. One transmission, which had run thirty thousand miles, showed slight chipping on the sliding dogs for the second gear. They also have some trouble breaking second-speed chains, due to the driver attempting to start on second gear on hills. Universal joints are fitted with annular ball bearings, which look light for the service. Rear drive is effected by worm and gear, made by David Brown & Sons. Worm is steel and the gear of bronze. The reduction was formerly 6 to 1 with a four-thread worm, and the life of these gears was about sixty thousand miles. The reduction was changed to 8 to 1 by using a three-thread worm, and the life dropped to between two thousand and five thousand miles, owing to the change in spiral angle.

The differential case is a drop forging, and it and the worm gear are mounted on ball bearings in a cover which drops into the

*Paper by A. B. Cummer and B. B. Bachman, read before the Philadelphia Branch of the S. A. E.

housing through an opening in the top. The axles are formed into hexagon ends for driving, and are made out of forged bars of air-hardened, chrome-nickel steel.

Cars are equipped with double internal brakes, 14 in. in diameter by 2½ in. face, surfaced with asbestos-brass fabric. Life of surface varies from one week to three months, depending on the operator. The wheels are cast steel, and run on plain bearings, consisting of a floating bronze bushing between hardened-steel tube and wheel liner. The axle housings are made of electric-furnace steel castings, which run very uniform. The frame is made up of wood reinforced with two steel plates, one on either side of the wood. The rear hanger for the front spring is a scroll spring. The drive and torque are both taken through the rear springs, which are half-elliptic. They have discontinued the practice of grinding the cylinders, claiming better results by smooth boring and running in with belt.

Examination of chassis in repair shop showed considerable wear in brake-rod clevises, etc., which were not bushed. Spring clips and bolts were very small, the clips not appearing to be over ½ in. diameter. They provide for the drive of a dynamo for electric lighting in their transmission, and are experimenting with various types, but have arrived at no decision.

Manufacturing methods were poor. Practically no jigs were in evidence, and fitting and scraping by hand was very common on all assembly work.

Regarding commercial cars for carrying loads of one and a half tons and less, the types generally seem to impress one as being, in the main, on the lines of converted touring cars. Two-cylinder, vertical motors of 16-18 h.p. are generally used up to two ton capacity, and some makers quote special prices for equipping with four-cylinder motors.

Regarding the manufacture and use of commercial cars, all of the commercial car manufacturers are practically building their cars to order, complying with the purchaser's specifications as regards wheel base, body sizes, etc. There does not seem to be any definite guarantee accompanying the car other than that covering defective workmanship and material for a period, in most cases, of six months.

None of the manufacturers with whom we came in contact are doing anything in the way of maintenance or inspection of their cars, and the users obtain very little assistance from the manufacturers in operating. On the other hand, the operators have systematized to a very large extent the routing of their merchandise in such a way as to ensure that the cars are loaded with the particular kind of goods for which they are intended, and the dangers of overloading seem to be appreciated and guarded against very carefully.

The methods of English manufacturers are very different from the American methods. These are probably best suited to the conditions under which they are working. Labor is very much cheaper, and this seems to be the main reason for the lack of labor-saving machinery, such as is in evidence here in all large shops. The manufacture of component parts by concerns who specialize on one element of an automobile is practically unknown. Most of the manufacturers build everything in the car with the exception of carburetor, magneto and wheels. Most of the plants seem to have their own foundries for cast iron, bronze and aluminum.

Cast-steel wheels have almost entirely been adopted in place of wood wheels. The fact that good wood, as is in use in this country cannot be obtained, is probably a factor which leads to the development of this type of wheel. However, the people who use the steel wheel seem to be obtaining very good service, and express themselves as being well satisfied with its performance. Tire wear does not seem to be affected greatly; if there is any difference, it is in favor of the wood wheel. The steel wheels weigh more than

the wood wheels, and are less expensive, but are more expensive than *our* wood wheels.

Tire mileages obtained are very high, twenty thousand miles being very common, and even higher mileage being by no means rare. The wheel sizes on a truck of three tons are usually 36 in. front and 40 in. rear; tire sizes, 4½ in. to 5 in. front and 4 in. to 4½ in. rear, dual type.

The metal-base tire seems to be most in favor, and the makes most in evidence were the Polack, Continental and Peter Union. Dual tires are used on the rear wheels of all sizes of cars, which may be due to the long bodies in use, with attendant excessive overhang, and in England solid tires were used altogether on cars over 1000 lbs. capacity. The representative of the Michelin Company made the statement, that they were in a position to equip satisfactorily cars up to three tons capacity with dual or triple pneumatics on demountable rims.

Practice for rear axles and final drive seem to be fairly divided between shaft and chain drive. The shaft drive is, however, represented by a larger number of makers than here. Some use the worm gear, others a combination of spur and bevel gearing, and others internal gears in the wheels. The wheel bearings are, almost without exception, plain. The most used design is a sleeve of bronze or cast iron between a hardened-steel sleeve and a hardened-steel bushing in the wheel. Front axles are usually forgings with the yoke formed on the spindle. None of them were provided with thrust bearings in the steering pivot.

The Leyland car had a unique axle design, wherein the pivot pin was directly in line with center of the spokes, which, the operator said, made very easy steering. These wheels were mounted on Hoffman ball bearings. Steering gears were all irreversible, with a very low gear reduction. Springs were mostly half-elliptic, comparatively short in front and long and flat in the rear, and made up of a small number of thick plates.

The salient points covering the operation in foreign countries of the commercial vehicles may be briefly enumerated as follows:

In the first place, the owner is thrown more largely on his own resources than in this country, and this is due to the fact that he alters the specifications of the car to a greater or less extent according as his views differ from the manufacturer. This entails upon the manufacturer the building of special vehicles in the design of which he has only been a co-operator, and therefore he cannot be expected to stand behind them to the extent of the manufacturer who has entirely standardized his own product. These being delivered to the owner as special cars, it compels the owner to put in what might be termed a small manufacturing equipment, to make such special parts as he has incorporated in his car and cannot call on the manufacturer for.

This very materially limits the manufacturer's guarantee; and because of the additional responsibility thrown upon the owner, he is also much more careful in their operation. He allows the driver sufficient time during his working day to properly inspect, lubricate and adjust his vehicle, and would rather impair the efficiency of his delivery department than to jeopardize his investment in the car by sending it out in a poor condition. The driver has nothing to do but care for his vehicle and drive, and the handling of the merchandise is entirely in the hands of a second man or porter. This porter proceeds to the owner's establishment at the beginning of his working day and there sorts out, in relation to position of the route, the packages that are assigned to his trip, packs them in large baskets, and when the driver appears with his car they are rapidly loaded in the vehicle, thereby very materially reducing the standing or idle time. The drivers are also more reliable than the American drivers, and more amenable to orders. In some cases the owners penalize their drivers for excessive repair work or road troubles; in other cases they give them a bonus when upkeep costs

Impressions of European Manufacturing and Operating Methods as Applied to Commercial Vehicles*



WHILE this paper is ostensibly devoted to commercial car practice, it will probably be of interest to the members to give a brief review of the principal impressions gained at Olympia.

In the first place, this show was given over entirely to pleasure cars and accessories; there seems to be no demand for a commercial car show, or if there is, the manufacturers are not inclined to respond.

In some details there was greater divergence of ideas shown in the design of the models on exhibition than has been apparent at our own shows for the past two or three years. In others, there seemed to be a well-defined unanimity of opinion.

In the first class were such features as enclosing the valve springs and cam followers, casting the cylinders en bloc, thermosyphon cooling systems, subcrankcase oiling, four-speed transmissions with selective control, service brake at the rear of the transmission, three-quarter elliptic rear springs, and demountable wire wheels.

In the latter class were the following: First, cam-shaft drive—at this point there is a fairly even division between spur gears and silent chain, and one maker used worm gears. Second, the increasing number of models equipped with sleeves or rotary valves. The most prominent of these is the Knight motor, which is being used by three or four English makers and three prominent Continental firms.

In addition to this, there were three other motors on exhibition. Probably the one which showed the greatest promise was the Argyll motor, in which a single sleeve, to which is imparted a combined rotary and reciprocating motion, acts as the valve. On the surface this arrangement seems to offer some advantages over the Knight motor, inasmuch as it eliminates one sleeve with the attendant difficulties in construction which the latter design presents.

The next which deserves mention is the new Itals motor, in which a single rotary valve is placed in a vertical position between each cylinder pair, and contains parts which alternately index with a single port in each cylinder. By this it will be seen that the same cylinder port serves both for inlet and exhaust, the connection to the proper passages being made by means of the valve. The valve is cored for the passage of water through it, and means are provided to balance the valve against explosion pressure.

In addition, there was the Darracq, which had a rotary valve in a horizontal position at the upper side of the cylinder, which alternately connected the cylinder with the inlet and exhaust passages; and the Hewitt motor, which replaced the poppet valve with pistons.

The silent-chain transmission was shown in one model, but its advantage seemed to be of doubtful value. In the first place, it makes a more bulky unit and one which weighs more and costs more to build. Secondly, the prime cause of trouble in any slide-gear transmission is the burring of the teeth in changing gears, and this element has not been removed, although its effects may be lessened by the small diameter of the engaging elements and the greater elasticity of the chain.

The worm-gear final drive was exhibited by a number of makers, and makes a very pleasing construction.

The surprising feature is that there is considerable variation in opinions as to the value of this feature, tending to show that

the spiral gear as a final drive for automobiles is still an uncertain quantity and subject to a good deal of study before it will prove itself capable of superseding the bevel gear.

There were a number of cars in which the radius rod had been eliminated and the drive taken through the springs, and in some instances the torque rod was also eliminated.

Another point of interest is the tendency toward motors of small bore and long stroke. This is due to the system of taxation and the efforts of the manufacturer to obtain the maximum power with a motor which is subject to the lowest possible tax. This, in addition to the general inflexibility of English motors, has created the demand for four-speed transmissions.

Now, relative to commercial cars, the following description of the cars made by the London General Omnibus Company is indicative of general design, inasmuch as these people are making cars for their own needs after operating several different models of prominent make, which embody the good points and eliminate the bad ones shown by their experience with these cars.

The car weighs 8064 lbs., and carries thirty-six people, including crew of two men. The motor is $4\frac{1}{2}$ in. bore by $4\frac{1}{2}$ in. stroke, four cylinders, cast in pairs, tee-head with mechanism enclosed. Subcrankcase oil is provided, aluminum pans under each connecting rod being kept filled at a constant level by a gear pump. Connecting rod and crank bearings are Babbitt-lined bronze. The piston pins are retained and held from turning by a piston ring. The cylinders are not baffled. Ignition is effected by a single Bosch magneto with fixed spark. The magneto is enclosed in an aluminum case provided with a padlock.

Most of the cars are equipped with Solex carburetors. Thermosyphon cooling system is used, and the car seems to overheat more than it ought. The radiator is composed of an aluminum head and base, with tubes connecting the two. There are no fins on the tubes. The clutch is of the reverse cone type, being brought into engagement by a flat spring, the ends of which are seated on the flywheel face. A clutch brake is provided, being composed of leather-faced disc on the clutch shaft, with which a spring arm having about 180 degrees segment comes into contact.

The transmission is three speeds forward and one reverse, of the silent-chain type. Shafts and gears are mounted on Hoffman ball bearings. The main shaft has six integral keys, and the sliding gears are ground on the inside diameter to fit the shaft. These transmissions have run eighteen months without overhauling. One transmission, which had run thirty thousand miles, showed slight chipping on the sliding dogs for the second gear. They also have some trouble breaking second-speed chains, due to the driver attempting to start on second gear on hills. Universal joints are fitted with annular ball bearings, which look light for the service. Rear drive is effected by worm and gear, made by David Brown & Sons. Worm is steel and the gear of bronze. The reduction was formerly 6 to 1 with a four-thread worm, and the life of these gears was about sixty thousand miles. The reduction was changed to 8 to 1 by using a three-thread worm, and the life dropped to between two thousand and five thousand miles, owing to the change in spiral angle.

The differential case is a drop forging, and it and the worm gear are mounted on ball bearings in a cover which drops into the

* Paper by A. B. Cummer and B. B. Bachman, read before the Philadelphia Branch of the S. A. E.

housing through an opening in the top. The axles are formed into hexagon ends for driving, and are made out of forged bars of air-hardened, chrome-nickel steel.

Cars are equipped with double internal brakes, 14 in. in diameter by $2\frac{1}{2}$ in. face, surfaced with asbestos-brass fabric. Life of surface varies from one week to three months, depending on the operator. The wheels are cast steel, and run on plain bearings, consisting of a floating bronze bushing between hardened-steel tube and wheel liner. The axle housings are made of electric-furnace steel castings, which run very uniform. The frame is made up of wood reinforced with two steel plates, one on either side of the wood. The rear hanger for the front spring is a scroll spring. The drive and torque are both taken through the rear springs, which are half-elliptic. They have discontinued the practice of grinding the cylinders, claiming better results by smooth boring and running in with belt.

Examination of chassis in repair shop showed considerable wear in brake-rod clevises, etc., which were not bushed. Spring clips and bolts were very small, the clips not appearing to be over $\frac{1}{2}$ in. diameter. They provide for the drive of a dynamo for electric lighting in their transmission, and are experimenting with various types, but have arrived at no decision.

Manufacturing methods were poor. Practically no jigs were in evidence, and fitting and scraping by hand was very common on all assembly work.

Regarding commercial cars for carrying loads of one and a half tons and less, the types generally seem to impress one as being, in the main, on the lines of converted touring cars. Two-cylinder, vertical motors of 16-18 h.p. are generally used up to two ton capacity, and some makers quote special prices for equipping with four-cylinder motors.

Regarding the manufacture and use of commercial cars, all of the commercial car manufacturers are practically building their cars to order, complying with the purchaser's specifications as regards wheel base, body sizes, etc. There does not seem to be any definite guarantee accompanying the car other than that covering defective workmanship and material for a period, in most cases, of six months.

None of the manufacturers with whom we came in contact are doing anything in the way of maintenance or inspection of their cars, and the users obtain very little assistance from the manufacturers in operating. On the other hand, the operators have systematized to a very large extent the routing of their merchandise in such a way as to ensure that the cars are loaded with the particular kind of goods for which they are intended, and the dangers of overloading seem to be appreciated and guarded against very carefully.

The methods of English manufacturers are very different from the American methods. These are probably best suited to the conditions under which they are working. Labor is very much cheaper, and this seems to be the main reason for the lack of labor-saving machinery, such as is in evidence here in all large shops. The manufacture of component parts by concerns who specialize on one element of an automobile is practically unknown. Most of the manufacturers build everything in the car with the exception of carburetor, magneto and wheels. Most of the plants seem to have their own foundries for cast iron, bronze and aluminum.

Cast-steel wheels have almost entirely been adopted in place of wood wheels. The fact that good wood, as is in use in this country cannot be obtained, is probably a factor which leads to the development of this type of wheel. However, the people who use the steel wheel seem to be obtaining very good service, and express themselves as being well satisfied with its performance. Tire wear does not seem to be affected greatly; if there is any difference, it is in favor of the wood wheel. The steel wheels weigh more than

the wood wheels, and are less expensive, but are more expensive than our wood wheels.

Tire mileages obtained are very high, twenty thousand miles being very common, and even higher mileage being by no means rare. The wheel sizes on a truck of three tons are usually 36 in. front and 40 in. rear; tire sizes, $4\frac{1}{2}$ in. to 5 in. front and 4 in. to $4\frac{1}{2}$ in. rear, dual type.

The metal-base tire seems to be most in favor, and the makes most in evidence were the Polack, Continental and Peter Union. Dual tires are used on the rear wheels of all sizes of cars, which may be due to the long bodies in use, with attendant excessive overhang, and in England solid tires were used altogether on cars over 1000 lbs. capacity. The representative of the Michelin Company made the statement, that they were in a position to equip satisfactorily cars up to three tons capacity with dual or triple pneumatics on demountable rims.

Practice for rear axles and final drive seem to be fairly divided between shaft and chain drive. The shaft drive is, however, represented by a larger number of makers than here. Some use the worm gear, others a combination of spur and bevel gearing, and others internal gears in the wheels. The wheel bearings are, almost without exception, plain. The most used design is a sleeve of bronze or cast iron between a hardened-steel sleeve and a hardened-steel bushing in the wheel. Front axles are usually forgings with the yoke formed on the spindle. None of them were provided with thrust bearings in the steering pivot.

The Leyland car had a unique axle design, wherein the pivot pin was directly in line with center of the spokes, which, the operator said, made very easy steering. These wheels were mounted on Hoffman ball bearings. Steering gears were all irreversible, with a very low gear reduction. Springs were mostly half-elliptic, comparatively short in front and long and flat in the rear, and made up of a small number of thick plates.

The salient points covering the operation in foreign countries of the commercial vehicles may be briefly enumerated as follows:

In the first place, the owner is thrown more largely on his own resources than in this country, and this is due to the fact that he alters the specifications of the car to a greater or less extent according as his views differ from the manufacturer. This entails upon the manufacturer the building of special vehicles in the design of which he has only been a co-operator, and therefore he cannot be expected to stand behind them to the extent of the manufacturer who has entirely standardized his own product. These being delivered to the owner as special cars, it compels the owner to put in what might be termed a small manufacturing equipment, to make such special parts as he has incorporated in his car and cannot call on the manufacturer for.

This very materially limits the manufacturer's guarantee; and because of the additional responsibility thrown upon the owner, he is also much more careful in their operation. He allows the driver sufficient time during his working day to properly inspect, lubricate and adjust his vehicle, and would rather impair the efficiency of his delivery department than to jeopardize his investment in the car by sending it out in a poor condition. The driver has nothing to do but care for his vehicle and drive, and the handling of the merchandise is entirely in the hands of a second man or porter. This porter proceeds to the owner's establishment at the beginning of his working day and there sorts out, in relation to position of the route, the packages that are assigned to his trip, packs them in large baskets, and when the driver appears with his car they are rapidly loaded in the vehicle, thereby very materially reducing the standing or idle time. The drivers are also more reliable than the American drivers, and more amenable to orders. In some cases the owners penalize their drivers for excessive repair work or road troubles; in other cases they give them a bonus when upkeep costs

are low. Good drivers are easily obtained, as it is not necessary for a driver to also understand the handling and delivery of merchandise.

The European owner understands more clearly the limitations of the commercial vehicle's capabilities, and so plans his work that it shall come within these limitations. When he has a car built and put into service for certain work or carrying of a certain class of merchandise, it is not used for any other purpose. This procedure results in practically no overloading of the vehicles. The

overspeeding is taken care of by the police regulations, in that every conviction of a driver is endorsed on his license. The first two offenses carry graduated fines, and the third offense usually results in the revocation of his license for from six months to two years. On account of the heavy penalty exacted from the owner for sending his car out with an unlicensed driver, the man whose license has been revoked is out of a job, and owing to the plentiful supply of drivers, he is careful not to jeopardize his position.

A Trackless Locomotive

BY MAX H. GRABOWSKY



WHICH is precisely what the industrial automobile, the motor truck, is. To this transportation tool, which covers nearly every field of carriage from light delivery to heavy trucking, is due the greatest consideration, not only as a means of bettering service and extending markets, but as a delivery expense reducer.

One of the problems of business men has been logical merchandise delivery. But skill and brains, backed by necessary means, has produced the motor truck, which has proven the one hope of solving scientifically, economically, and surely, these delivery problems that have increased daily.

Aside from service viewpoint, the motor truck is a sound investment. The combination of authentic statistics—facts and figures shown, of results attained—the widening range of motor service, and its ability to make hurry deliveries at a high speed, have done considerable towards the remarkable development of this industry and the rapidity of its growth.

Its scope is broader than the utilitarian advantages of efficiency, economy, ability to wipe out the line between city and suburban deliveries, quickness in covering distances, etc., which the motor truck possesses by an overwhelming majority over horse-drawn wagons. Sanitary and humanitarian reasons make the ultimate displacement of the animal for hauling-work inevitable.

The rise and fall in temperature makes a vast difference if the power be animal. During hot spells and blizzards the horse has proven inadequate. This was strikingly exemplified the past summer, when these faithful dumb animals were found in alarming numbers, either prostrated or dead on the streets. To the contrary the motor truck, was ever "on the job" despite weather conditions.

Municipal authorities are now realizing the fact that the commercial vehicle is a practical, successful business proposition, capable of displacing the horse, from a dollar and cents standpoint, and it is only a question of time—and a short time at that—when they will undoubtedly make laws to enforce its use on the city streets. Think of the immense saving on municipal bills for street cleaning, etc., such change would effect; also a decided change for the better in sanitary conditions.

Now that the importance of the horseless business wagon is universally recognized and every intelligent business man is thinking hard in the matter, the first step should be the selection of the right truck, which is the beginning of service and economy in motor delivery.

Price, though bound to be considered, is not the most important thing. While the initial investment is seemingly large, it is not the first cost that should receive chief consideration in the purchase of a business machine. If you bought a car because it

was cheap and its service proved unreliable and costly, it would not be a good investment.

Service, operating cost, endurance: these vital points hinge on the construction of the truck. Hence, it is construction that should receive the most consideration. There should be the greatest simplicity of construction and adjustment. The truck that is constructed mechanically correct will, in the end, cost by far the least, as the service will be reliable, upkeep cost low, and the life of the car longer.

Look to it that the all-important feature is incorporated in the construction of the truck to develop this top-notch result. That feature is accessibility.

There is not, and never will be a combination of mechanical parts which do not require attention. Every mechanical device demands inspection and adjustment to produce good service and keep cost of same down, and the greatest results only come to those who observe this natural law.

Neglect is death to a motor truck. The average driver positively will not give the motor (which is the heart of the machine) the attention necessary if inaccessible. Inaccessibility results in neglect. Neglect means loss of operating efficiency, high repair bills, and early and rapid depreciation; hence the vital importance of accessibility.

The next important consideration after selecting the right truck, is the man at the steering wheel.

The man who pays the bills should see that his investment is taken care of by being placed in the hands of a competent, conscientious driver. If the truck is not complicated and the mechanism accessible, the man who has made good as your horse driver will usually quickly learn and make good in charge of your motor truck.

Impress on him the importance of handling the car on the same basis as any other high-class machinery, that it has its needs, its limits of endurance same as any piece of machinery.

Truck drivers are like engineers—one will get more work and less wear and tear out of a machine than another.

Just stop and think how the oldest self-propelled machine—the railroad locomotive—is protected. It is only expected to do a given amount of work, when it is carefully inspected and any adjustment or repairs necessary immediately made. Positively cannot make another run until this is done.

Neglect to properly adjust some small integral part would cause delay, perhaps serious disaster. It is equally as essential to inspect and adjust the mechanism of a motor truck, which, too, is a piece of machinery—a trackless locomotive.

In this way the truck's efficiency may be kept up to par many years.

Mechanical Perfection and Imperfection As Seen At the Shows—In Part a Criticism

By E. S. FOLJAMBE

To those who have been sleep-walking under the delusion that present truck mechanism is close to perfection, a rude awakening must have followed a close inspection of the models exhibited at the recent National Shows. It is true, these cars are nearing a standard design and a construction, which has been shown by daily tests, under the ruthless hand of the driver, to possess the maximum factor of resistance; yet the materials and the design of the minor details of the best "lay-out" may be such as to render the whole quite useless.

The materials at the disposal of the designing engineer of any high grade commercial car are to-day of such exceptionally good quality, and possess such strength and fatigue resisting characteristics, that failure to satisfactorily perform cannot be ascribed to the metal in the parts. The failure must of necessity come home to the designer.

That commercial cars are surely taking up the burden of the world's local transportation problems is an undeniable fact. But this work is often greatly hindered by so called defects in minor details of the construction. Parts break or wear out when they should go on giving service for a much longer period. The material is often blamed when, in fact, the design is really at fault.

Parts, which are needlessly heavy, not only represent a waste of material but often impose unnecessary strains on other parts of the mechanism. The attempt to make a rigid construction where a flexible or jointed assembly should be used, is sometimes possible by brute strength of massive parts, but this greatly cuts down the paying load possibilities.

Fallacy of Rigid Motor Mounting

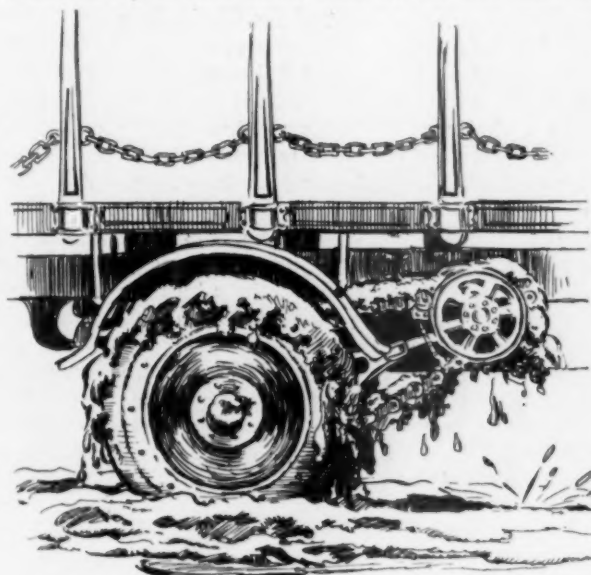
The writer was, therefore, somewhat surprised to find so many engines still rigidly attached to the main frame without even the interposition of small springs or even semi-compressible pads. It is a well known fact that no frame is so rigid that it does not weave, due to its load or road inequalities, nor is it deemed advisable by the best engineers to attempt to make a construction so massive that it will approximate a rigid form. In spite of these facts, enormously large, long and heavy engines are shown, not only bolted to the main frame at as many as six or eight parts but were shown even with integral crank case pans extending from the case to the frame, resting with a lip against the frame for the entire length and bolted rigidly to it. Doubtless such a brutal construction can be made so heavy and massive that it will not break when traveling over uneven roads, but it is certainly a waste of good material which might very much better be used at other places where strength is needed, or even be replaced by "pay-load." Protecting pans are, of course, an essential, but is cast aluminum a suitable and proper construction? Such pans can be made more cheaply of very light sheet metal, prevented from drum-like vibration by applied canvas or other material and will weigh but a fraction of the weight of a cast pan.

With the engine three point, flexibly mounted, its case can be made very much lighter. Three point suspension of the motor, however, is also very much in the minority as yet. Fully 65 per cent. of the truck engines shown being mounted

on either the main frame or a sub-frame at four points.

Several engines were noticed that were bolted at the front and rear to cross frame members, but the bolts were so close together (in one case not over 4 in.) that the crank case must have been needlessly subjected to large torque reaction strains.

Unit power plants or constructions in which the engine, clutch and transmission are combined into a single unit are very little used on trucks, these being shown on not over 14 per cent. of the machines. This is largely due to the fact that in commercial car design, it is more desirable, especially in the large trucks, to have the change speed mechanism combined with the jack shaft, about 50 per cent. of the trucks at Chicago having this construction. About 23 per cent. had the change speed mechanism mounted at the middle of the chassis, usually on a sub-frame; while the rest were either of



No Chain Should Ever Be Exposed to Water, Mud and Dust. This is not engineering.

the unit type, planetary gears mounted on the engine shaft crosswise of the frame, or were of the friction type.

More Individual Clutch Transmissions

The sliding gear has never been considered good engineering practice and would undoubtedly have been discontinued and replaced by some other less harsh method of transmitting the power, if it had not been for the advent of the modern alloy steels, such as Nickel, Chrome Nickel and Vanadium, which are capable of withstanding without fracture the terrible abuse imposed upon a sliding gear. In commercial car design, however, there is noticeable a strong undercurrent toward the use of the individual clutch transmission, in which the gears are always in mesh and cannot be abused by even a careless driver. The type of clutch used varies, but dog or lug clutches are most prominent. There are some transmissions, however, fitted with friction clutches, usually of multiple disc type, and also some novel constructions in which the gears are gripped or locked to the shaft by what might be termed an internal

disappearing key which engages teeth or projections on the inside of the gear hub as desired.

One of the greatest drawbacks to the general introduction of commercial cars is the difficulty of securing careful, painstaking and competent drivers. Where any vital mechanism is used, that can be instantly put out of commission by a careless operator, the chances for unsatisfactory service are greatly increased. This accounts for the quest after some form of change speed mechanism which will be practically foolproof and the sliding gear will hardly be called such by even its most ardent advocates. Nevertheless, sliding gears still hold the field against all comers, although many of the 800-lb. to one-ton trucks are fitted with planetary transmissions. Nearly all the sliding gears are selectively operated, giving three speeds forward and one reverse, four speeds being supplied only on the largest trucks.

Friction transmissions are undoubtedly gaining in number, there being more new ones shown this year than heretofore. The ever increasing use of this form of drive is another silent protest against the sliding gear.

The Advent of the Chain Case

No chain should ever be exposed to water, mud and dirt. This is not engineering and it is surprising that so called engineers and designers continue to force on the public, trucks with such important driving members entirely unprotected. These facts have long been recognized, but it is only with the coming of internal spur gear drives, worm drives and other enclosed mechanisms that the chains are also being protected. The large number of chain cases this year was very apparent, there being many more than ever shown at any previous exhibit. Many of these have been worked out very carefully, so that adjustments can be made almost as easily as without the case.

Every radius rod should have a marked adjustment, so that the most careless driver or repairman can see that both sides are taking up equally. Neglect of this slight refinement has caused the driving of many a truck with the rear axle, far from parallel to the front axle, resulting in excessive wear on chains, sprockets and tires. Yet the cars fitted with such reference marks can be counted on one hand.

It needs no engineering training to know that a radius rod should pivot in the axial line of the sprockets, but trucks are still seen with these rods attached to hangers fully 8 or 10 in. to the rear of the jack shaft.

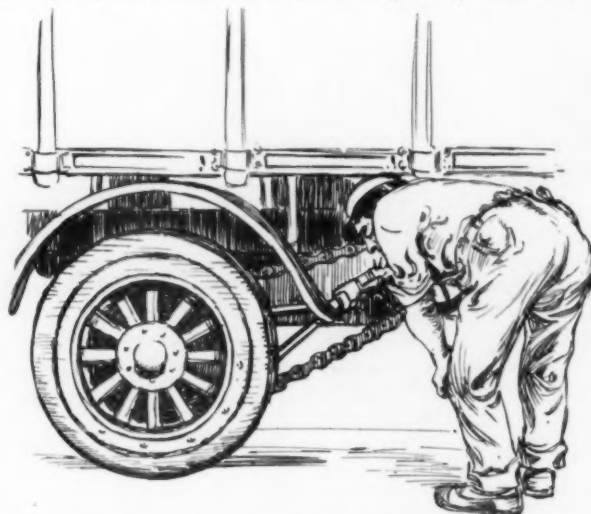
Many of the commercial cars this year have discarded frames made of rolled channel or I-section structural steel beams; these are very much heavier for their carrying capacity than pressed steel frames of heavy gage, and it is with pleasure that the writer noticed the almost complete disappearance of structural steel frames. Most all the high grade machines are now equipped with pressed steel frames, very similar in general design to those of the ordinary touring car. A return to an early practice in frame construction is also to be noticed on several commercial cars, in that the frames are reinforced with oak, ash or hickory. These are not exactly armored wood frames in the strict meaning of the term, as this implies a wooden frame reinforced by sheets of steel. In these modern wood and steel combinations the frame proper is of steel while the reinforcing is wood, the channel sections being completely filled with a bar of wood bolted in position, greatly stiffening the frame and making it more resilient. This construction also facilitates attaching other parts to the frame.

Spring-Suspended Radiators

Practically all the truck radiators are spring suspended, mounted on ball or trunnion joints or on pads of leather, fabric or cork. In other words the radiators are so mounted that they are independent of the motions of the body, frame, etc., and cannot be distorted or caused to leak by distortion of these. However, the writer still found radiators bolted rigidly to the frame on trucks which were supposed to have been designed by competent engineers.

Jack-Shaft Brakes

The use of the jack shaft brake has greatly increased. Many machines which formerly had two sets of brakes in the rear wheels are now shown with brakes at the extreme outer ends of the jack shaft, these being enclosed and of the expanding type. A few are showing contracting band brakes in the same location. Practically all of these are fabric faced. In some trucks the jack shaft brakes are placed at each end just inside of the frame line, thus losing one of the chief advantages of the jack shaft brake location,—namely, accessibility. A few trucks, the writer is sorry to say, were shown



Every radius rod should have a marked adjustment so the driver will know that both sides are taken up evenly

with a single brake on the jack shaft acting on only one wheel.

Although all truck brakes on the rear wheels are now being protected, the writer was surprised to find a well known maker with well designed brakes on the rear wheels absolutely unprotected even by a dust shield.

The metal-to-metal brake seems to be losing in favor and the use of fabric-faced brakes is almost universal.

Dirt in the Engine

The truck manufacturers, almost without exception place the carburetor in a position in which the air is drawn in from the front. Almost none of these are provided with strainers or any protection whatever from the dirt and dust passing through the radiator, in fact, drawn through the radiator by the fan. Wherever a car follows other machines on the road, clouds of dust are usually drawn in and forced on to the engine, part of this dirt passing with each suction stroke directly into the combustion chamber of the cylinders. Chemical analysis has shown that a large part of the so called carbon deposits in the combustion chamber of an engine, is nothing more nor less than silica or, in other words, dirt from

the road. This dirt is caught and held by the residue from burnt oil and is baked onto the piston and cylinder heads, forming a large part of the supposed carbon deposit. It being such a simple matter to arrange the carburetor intake so that the air would be drawn from a dustless compartment, it would seem that such a method might be easily adopted to protect the motor. Manufacturers are now attempting to protect the engine parts by putting special covers over each individual part, such as the magneto, over-head valves, or the valve mechanism at the sides, but none so far, with perhaps the exception of one, has attempted to close the entrance to dirt into the engine compartment. Why not provide a duct or passageway for the air drawn through the radiator, so that it could pass down and out below the vehicle instead of arranging the fan so that it drives all dirt directly on to the motor. This air draft is not necessary for motor cooling on any water-cooled engine.

Too Small Clearance

The clearance of the various parts of the mechanism on several of the high-grade trucks is altogether too small, the space between the brake rods and the parts of the frame are such that vibration of the car will cause a rattle. The clearance between the chain and the flange of the rear wheels is often so small that it is next to impossible to apply any kind of an anti-skid device. The location of the magneto, carburetor, pump, etc., is too often such that it is extremely difficult to get at them to adjust or remove them.

Lack of Unit Construction

The idea of individual units which together form a complete car is by no means new, but as yet the commercial car manufacturers, who have actually embodied such construction in their trucks, can be counted on the fingers of one hand. So called unit constructions are occasionally met with, but when it comes actually to the test, the replacing of the rear axle assembly, the jack shaft assembly, the clutch, transmission or the power plant, it very soon becomes apparent that the unit construction exists only in name. When it is attempted to remove one part, which, it is said, can be easily dismantled by simply taking off four or six nuts, it is found that first three or four other things have to be removed. In regard to the demountability of the engine, there is apparently no reason why nuts should be used at all. The same is true of the jack shaft. Quick-acting, hand cam-clamps can readily be used, locking the parts rigidly in position, yet capable of being instantly removed without slacking off and unscrewing a series of nuts which have either been painted or rusted in place, making them extremely difficult of removal.

The bumpers on most of the trucks are more or less inadequate. Too light material is used and very few are fitted with hard wood renewable parts to take the brunt of service.

Exposed Radiators

Radiators are too much exposed. In case of the team ahead backing up, the average truck radiator usually suffers, as it is so placed that lumber, ladders, pipes, etc., sticking out of the wagon ahead usually hit it. A more protected position for the radiator or a protecting grating is suggested.

An almost entire absence of sprags was observed at the show. Brakes are undoubtedly much better than they have been, but a positive preventive of unintentional craw fish hill descents is certainly needed on every heavy commercial car. This can be obtained only by the use of suitable sprags.

Self starters are also conspicuously absent on all the trucks and has been pointed out in these columns before. Engine starters are more essential on trucks than they are on pleasure cars.

Pedals Lack Guards

The brake and clutch pedals may also justly be criticised. Most of them are too small for suitable foothold and very few indeed are fitted with guards at the side. The roughening soon wears off, leaving a comparatively smooth surface, entirely unsuitable for a foothold, especially when the bottom of the driver's shoes are covered with ice as is often the case in winter.

Progressive Spring Suspension

Any spring has a range of load under which it acts best. With lighter loads it is too stiff and under too heavy loads it is not effective and may be strained to the breaking point. For this reason the writer calls attention to the defects of the spring construction of motor trucks and advocates the use of what may be called a "Progressive Spring Suspension," that is, one in which a set of light springs carry the light loads and either increasingly heavier springs or



Unintentional Crawfish Hill Descents

springs of gradually increasing stiffness are used for the heavier loads. The use of auxiliary springs is an attempt in this direction. However, the average truck vibrates excessively when running light and with the present construction, the power plant being mounted directly on the main frame, it usually suffers. The weight of the engine and other delicate parts is constant and should have springs for its mounting suited to its weight. An entirely separate set of springs should be used for this part of the mechanism, instead of depending on the massive springs intended for tons of load. The enormous springs on a five or seven-ton vehicle are entirely unsuitable for carrying the motor.

On at least three trucks in this country flexibility of the driving members has been considered, thus relieving all the transmission parts to the rear of the change speed mechanism. Longer life of all these parts is thus insured, to say nothing of the saving on the rear tires. It is, therefore, all the more surprising that out of some 225 makers only three have apparently given this matter any thought.

The Driver's Code From the Owner's Viewpoint

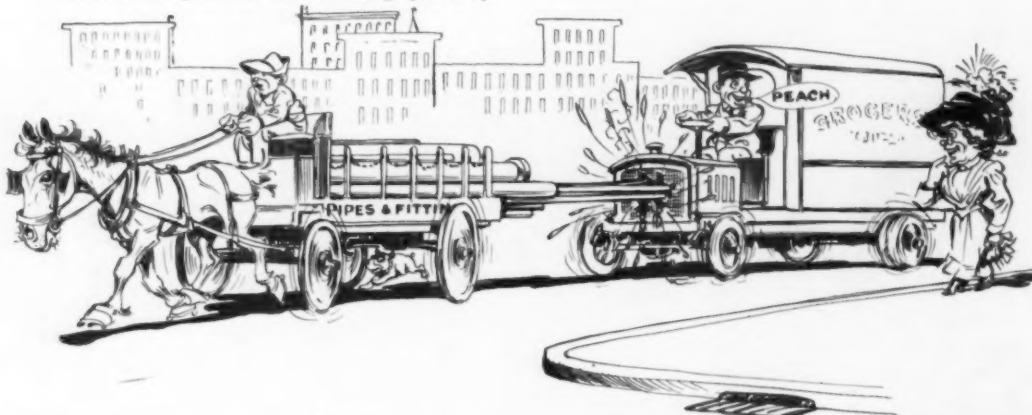
BY E. S. F.



Keep the extra magneto parts, spark plugs and other delicate parts in the tool box with the wrenches, jacks, etc. This will soon result in their taking on a beautiful and high polish!



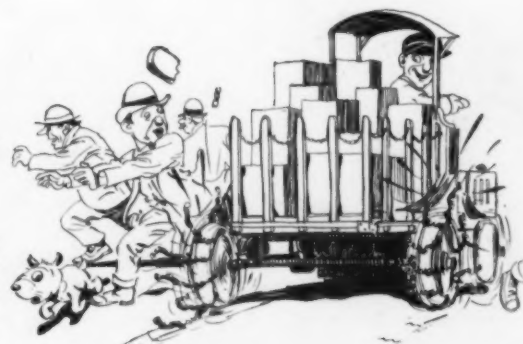
If there's a pool of oil on the garage floor, always let the truck stand in it. This is sure to keep the tires very soft.



When driving behind a load of pipes, run as close as possible. This is a positive cure for mud-clogged radiators.



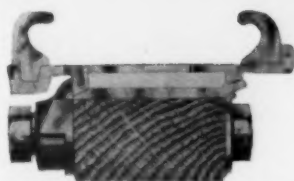
If you can't take all the hills on the high gear with full load, disconnect the governor, as this is a sure sign that it takes too much power to run it.



A loose, anti-skid chain is also an effective warning—mud guards are inexpensive, anyway.

THESE ARE NOT JOKES, EITHER—EDITOR

TRUCK ACCESSORIES AND APPLIANCES



Universal Quick-Detachable and Demountable Rims, Type 1—United Rim Company, Akron, Ohio.



The Hercules Tire Grip—Rochester Accessory Manufacturing Company, of Rochester, N. Y. This Grip was described in our last issue on page 45, but the wrong cut was used. The above cut shows the Hercules Grip.



The Lee Puncture-Proof Tire—Lee Tire and Rubber Company, of Conshohocken, Pa.

STANDARD UNIVERSAL QUICK-DETACHABLE DEMOUNTABLE RIMS

The United Rim Company, Akron, O., is making three styles of demountable quick detachable rims, two of which are illustrated herewith. These rims are used either single or double, and either for pneumatic or solid tires. The Type 1 rim is for all straight side or clincher tires. A collar on the outer extending part of the bolt serves the double purpose of holding the front washer against the felloe and supplying a jam seat for the bushing end of the clamp nut. The front washer, which fits over a square shank on the bolt, has an outward extending lug, which acts as a stop and prevents the clamp being overturned in either direction. In locking the rim to the wheel the mere turning over of the socket wrench carries the clamp into position. Type 2 rim is also for all straight side and clincher tires. Type 3 rim is made in two styles, one for clincher tires and the other for straight-side tires.



Universal Quick-Detachable and Demountable Rims, Type 2—United Rim Company, Akron, Ohio.

THE BULL'S-EYE SPARK PLUG

The feature of this plug is readily seen from the accompanying illustration which shows the apertures through which the spark may be seen at every explosion of the engine. Furthermore, it will tell whether the mixture is correct. A correct mixture will show a blue flame and a poor mixture a yellow flame. Made by the G. C. Blickensderfer Company, of Stamford, Conn., and sells for \$1.25.



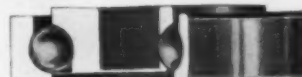
Bull's-Eye Spark Plug; showing the apertures through which the spark can be seen. These apertures also show whether or not the mixture is correct, by the color of the flame—G. C. Blickensderfer Stamford, Conn.

LEE PUNCTURE-PROOF TIRE

This tire is the product of the Lee Tire & Rubber Company, of Conshohocken, Pa., and on account of its puncture proof qualities is especially adapted to commercial cars, especially municipal vehicles, where speed and the elimination of tire trouble are the chief features. A glance at the illustration tells the story. The round steel discs imbedded in the tread prevent the entrance of sharp pointed objects. The tire is made by the one cure process.

A SUBSTITUTE FOR AIR IN PNEUMATIC TIRES

The S. & K. Tire System Company, 2021 Michigan Avenue, Chicago, Ill., are making an elastic compound of a grayish color in cylindrical form in lengths of about 2 ft. each. Instead of using an inner tube the outer case of the tire is filled with this material. It is claimed that this material is as resilient as air and that the same amount of pressure can be obtained as with air. It is made in all sizes from 3 x 28 in., price \$15, to 5 1/2 x 37 in., price \$37.50.



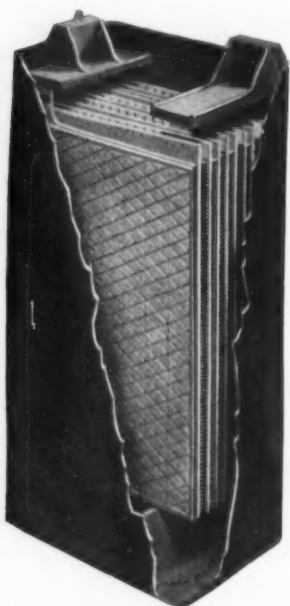
Shafer Radial and Thrust Bearing—Barthel, Daly & Miller, 42 Broadway, New York. This bearing is made in light, medium and heavy series. It is most suitable for differentials, clutches, steering gears and axles. It is a two-point bearing and requires the same space as the ordinary type of radial bearing.



Solar Electric Taxicab Tail Lamp—
Badger Brass Manufacturing Company,
Kenosha, Wis.

SOLAR ELECTRIC TAXICAB TAIL LAMP

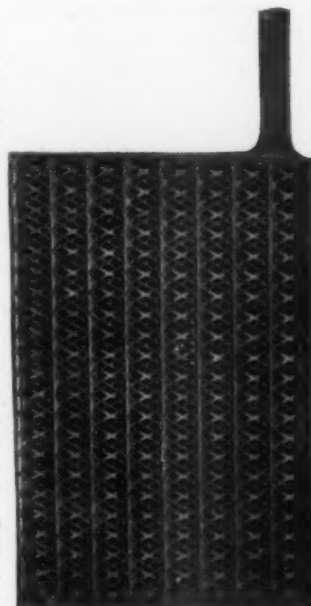
The Badger Brass Manufacturing Company, Kenosha, Wis., is showing with its line of electric lamps for pleasure cars, a special lamp to be used as a taxi-cab tail lamp. This is known as its Model 100 "E," and is a small round style lamp, $3\frac{3}{8}$ in. deep, 4 in. outside diameter, with a 3 in. ruby semaphore, and $1\frac{3}{4}$ in. wide side glass to show number. It has a combination prop for round or flat brackets, and is fitted with two or four candle power, six volt Edison Tungsten bulb, and can be supplied with a switch socket connector if desired. The price of this lamp is \$2.60.



Philadelphia Storage Battery, Type
W Cell Assembled Complete With L
Straps—Philadelphia Storage Battery
Company, Ontario and C Streets, Phila-
delphia, Pa.

PHILADELPHIA STORAGE BATTERIES

The well known commercial vehicle storage batteries, manufactured by the Philadelphia Storage Battery Company, of Philadelphia, are made in a number of types to suit each particular class of work. The standard plate, type "W" (illustrated) is intended for use in heavy trucks; the medium "M" plate for smaller or light delivery vehicles. This company uses what is called the Diamond Grid, and which it is claimed will resist twisting or buckling. The grid is cast with either horizontal or storage members. The sizes of the plates used in these cells is $5\frac{3}{4}$ in. wide by $8\frac{3}{8}$ in. long. The cells are assembled with from seven up to twenty-five plates.



Grid used in the Philadelphia Storage Battery; made by the Philadelphia Storage Battery Company, Ontario and C Streets, Philadelphia, Pa.

THE DIAGONAL BLOCK TIRE

This tire is designed especially for service on heavy trucks. It is composed of a number of independent demountable blocks, each of which can be taken off and replaced separately. The removal of a block is accomplished in a very few minutes by the use of four V-shaped bolts running downward through the rim of the wheel. The blocks are placed on the wheel diagonally and this feature is a most important one, since it provides a smooth, continuous roll, and at the same time preserves a steady resiliency which is necessary in all truck tires. The space between the blocks allows for rubber displacement and prevents the generation of heat. This tire is made by the Diagonal Block Tire Company, of Urbana, O.



Diagonal Block Tire—Diagonal Block Tire Company, of Urbana, Ohio. Each block can be easily removed without interfering with its neighbor. Each diagonal section has a downturned flange with an upturned hook projecting in the opposite direction. The bottom of this hook is filled with hard rubber, cured permanently into the shoe.

THE "DISCO" SELF-STARTER

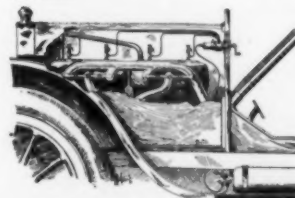
This device is manufactured by the Ignition Starter Company, of 724 Ford Building, Detroit, Mich. The starter is operated from the dash, by turning a small handle which operates a pump and forces gas from the gas tank into each cylinder of the motor. One revolution of the handle is enough to charge all cylinders. The "Disco" starter complete weighs less than 4 lbs. and is made entirely foolproof. The prices are \$50 for the 4-cylinder size; \$60 for the 6-cylinder, and \$75 for the 8-cylinder, without gas tank.



The Harrison Tubular Radiator—
The Harrison Radiator Company,
Lockport, N. Y.

THE HARRISON TRUCK RADIATOR

The principal aim in the design of this radiator was to attain simplicity in construction and durability under hard usage. The radiator is a tubular radiator and is made entirely of rolled sheet copper. Six or seven tubes are made together in one unit by corrugating a sheet of copper and bending the sheet back upon itself to form a series of tubes, with but one seam. A special feature claimed for this radiator is that it will not "neck-off," that is, it will not break off where the tubes are connected to the reservoir tanks.



"Disco" Self-Starter—Ignition Starter Company, Detroit, Mich. This starter utilizes the gas from the gas tank. It is attached to the engine by replacing the regular priming cups with special engine valves. The latter are connected by means of copper tubes to a distributor valve located on the dash. The gas tank is fitted with a two-way valve, one outlet of which is connected with the distributor valve on the dash, while this connects with the lights. This completes the installation.



The "Speedograph" Vehicle Movement Recorder—Recording Speedometer Company, Newark, N. J.



Woodworth Kant-Skid Tire Chains—Leather Tire Goods Company, Niagara Falls, N. Y. The cross members of the Kant-Skids are made of thick steel stampings which present a perfectly smooth, rounded surface to the tire and the curved edges of the metal to the road. In this way there is nothing to wear or injure the rubber, but the best possible grip is obtained on the road surface.

THE "SPEEDOGRAPH" RECORDER

The Recording Speedometer Company, Newark, N. J., exhibited the new speedograph for use on commercial cars. This instrument checks and shows the time the truck leaves the garage, or any given point, time of return, length and time of every stop made, also the total number of miles traveled, and gives a complete record of the variation in the speed during the entire run.

This can be compared with a route sheet, making it possible to tell exactly where the stops were made. The record, it is said, is not affected by hot or cold weather, cannot freeze or dry up or become blotted or indistinct.

The instrument is driven by flexible shaft in the usual manner, but all parts are sealed to prevent the driving mechanism from being tampered with; and the upper portion, containing the registering mechanism, is securely locked.



The "Speedograph" With Cover Removed Showing Recording Mechanism. Recording Speedometer Company, Newark, N. J.

WOODWORTH KANT-SKIDS

The Leather Tire Goods Company, Niagara Falls, N. Y., maker of the Kant Skid Chains, state that they are equally effective on solid or pneumatic tires. They are made in two styles, the side chain Kant-Skids and the single Kant Skids.

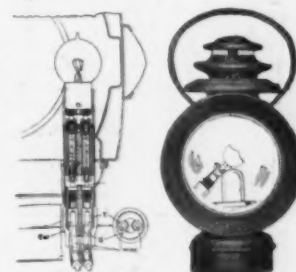
The side-chain Kant-Skids consist of two side chains forming a ring on each side of the wheel having the cross members attached at short intervals between them.

The single Kant-Skids have on each end of the cross members a strap with buckle for adjusting and a snap to enable one to readily take them off and put them on.

SOLAR COMBINATION TRUCK LAMP

The Solar combination electric and oil, or gas and oil truck lamp is made of 18 x 20 gage brass heavily reinforced. Is 15 in. high over bail and has double props $6\frac{1}{8}$ in. between centers for fork brackets. Has large capacity flat bottom oil fount, silvered metal reflector and a $\frac{3}{8}$ ft. gas tip. This is known as Model G15.

Gas and oil, price \$16.50 pair; electric and oil, price \$17.50 pair, and oil only, \$14.50 pair.



Solar Combination Electric and Oil Lamp—Badger Brass Manufacturing Company, Kenosha, Wis., is supplied with wireless electric fixture, which consists of a silver plated brass tube and bayonet lock slot at its upper and lower ends for Edison base bulb and connector, respectively. In this tube is fastened a double ended socket having insulated spring tension terminals, insuring a positive wipe contact.

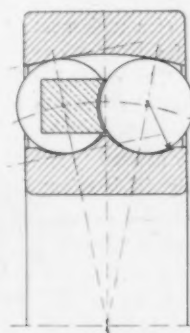
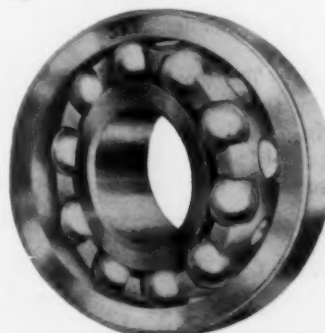
Solarswan connectors fasten to car wiring and lock to the lamp, eliminating two electrical connections. Are made of hard rubber, with brass bayonet lock pins, and two-piece terminals for each wire with a rubber screw cap wire finisher and lock.

S. K. F. BALL BEARINGS

S. K. F. ball bearings are made from the very highest grade of Swedish crucible alloy steel, which is hardened and tempered by a special process. They are sold in this country by the S. K. F. Ball Bearing Company, of 50 Church Street, New York City. Attention is called to the diagram which clearly shows the construction of these bearings. Though at first glance the diagram may appear deceptive an analysis of the stresses due to the load will clearly demonstrate that an equilibrium of forces is established without any tendency to bring the balls together, or create unbalanced pressure on the races. The tangents of each ball at its points of contact with the races are parallel, and lines drawn through the contact points of all the balls meet at the center of the shaft.

Inasmuch as the radius of the outer race is struck from the center of the bearing, the balls, cage and inner races, will rotate as a unit within this race, and over a range that would instantly destroy any plain, roller or ball bearing of the rigid type. In fact, the whole bearing constitutes a practically perfect ball and socket joint, capable of adjusting itself instantly

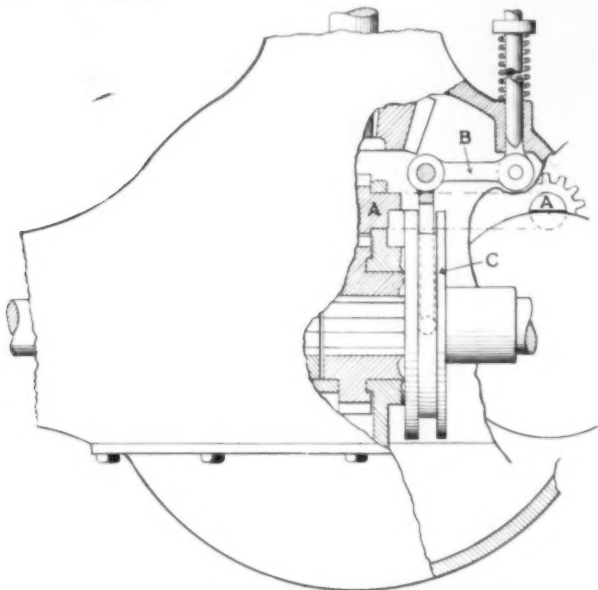
and automatically to any deflection of the shaft upon which it is mounted. Further, the load is automatically distributed on both rows of balls.



S. K. F. Radial Bearing and Diagram Showing Retainer and Self-Alignment Feature—S. K. F. Ball Bearing Company, 50 Church Street, New York. The diagram clearly shows the construction. The outer ball race is machined and ground to a radius struck from the centre of the bearing. The inner race is provided with two grooves, each having a radius slightly larger than the radius of the balls. The balls are retained in position by a single piece retainer, without rivets or screws.

THE CULLMAN DIFFERENTIAL LOCK

The Cullman Wheel Company, of 1344-54 Greenwood Terrace, Chicago, Ill., is manufacturing a line of spur gear differentials designed especially for motor trucks. These differentials are all fitted with locks, so that the operator can lock the rear wheels. The value of such a lock is readily appreciated, as with it the truck can be pulled out of mud holes very readily and slippery streets and roads can be navigated without skidding.



The Cullman Differential Lock As Arranged In a Differential Housing. Letter A indicates one of the small pinion gears, the shaft of which is cut in half. See text for further details.

The accompanying drawing shows the manner in which the Cullman differential is locked. A is one of the small pinion gears, of which there may be three, four or five, or any other number to the set. One pinion gear shaft of every set is extended $\frac{3}{8}$ in. beyond the case which holds the spur and pinion gears, and one-half of the extended shaft is cut away, as will be noted by the sketch. When the disc B is slid over toward the left it slides under the part that is cut away and prevents the pinions from rotating and locks the differential.

The bell crank lever C is connected to a foot pedal so that pressure on the foot pedal will extend the spring and move the disc underneath the half round extensions of the pinion shafts.

The operation is as follows: The foot pedal is pressed when the lever is in operation, and at the proper time the differential will be locked. The pedal is depressed as long as it is desired to hold the differential in locked position. When the pedal is released the differential will automatically unlock.

A careless driver never appreciates anti-skids until his car is stuck in a drift

Contemplating the purchase of a commercial car, are you? Fine—just what you should have done long ago. But, at the same time order a year's subscription for the C. C. J. This periodical will give you lots of good pointers, which will mean

THE HARTFORD AUTO-JACK

The Hartford Auto-Jack is very compactly designed and is housed in a casing of the toughest malleable iron, and a hardwood base gives perfect stability when the jack is in use. A



The Hartford Auto-Jack—The Hartford Suspension Company, 150-156 Bay Street, Jersey City, N. J. A feature of this jack is that it requires very little up and down movement of the operating handle. The turn of a unique reversing lever instantly makes the change from lifting to lowering, or vice versa. The list price of this jack is \$8.

15-lb. pressure on the handle will lift 1000 lbs. on its rack. The lifting rack and gears are cut from solid, then case-hardened. The jack has a lift of 6 in. and measures $10\frac{1}{2}$ in. over all in height. It sells for \$8.

THE FITZALL WRENCH

This wrench is made by the Standard Wrench and Tool Company, of Providence, Conn., in all sizes, and in "regular," "thin" and "pipe" models. Its adjustment is accomplished by the simple movement of the thumb pressing forward the sleeve which carries with it the wedge shaped lower jaw, until the nut to be turned is gripped. Pressure on the



The Fitzall Pipe Wrench—Standard Wrench and Tool Company, Providence, Conn. This wrench is also made in regular flat-jawed type for ordinary nuts. A special "thin" model is also made for use on thin nuts or in awkward places. Fitzall wrenches are made in all the regular sizes. A feature of this wrench is that it has only three parts, namely, the main handle bar, the wedge-shaped lower jaw and the yoke or sleeve which slides over the other two parts. The "pipe" model has no teeth in the lower jaw, and the tooth block in the upper jaw is removable, and can be easily and quickly renewed at slight expense.

handle bar immediately locks the lower jaw in place, and the harder it is pressed the stronger the hold. The locking of the jaw under pressure leaves just the required amount of play to allow removing the wrench without disturbing the position of the lower jaw and the taking of a new hold on the nut without any further adjustment whatever.

dollars and cents to you. And another thing, if you have perplexing problems confronting you, write to the C. C. J. and you will receive good advice through its columns in the "Information Bureau" department.



W. W. BARNETT, of Denver, Colo., has taken the agency for the Federal truck.

BAUMGARDNER & KIBBY, of Toledo, O., have recently taken the agency for the Cass truck.

THE GENERAL MOTORS TRUCK COMPANY has opened a Boston branch in charge of J. E. Baker.

D. B. ARTHUR, of the Ohio Motor Car Company, is now in charge of the commercial car department.

LOUIS S. MCCREARY, of Boston, Mass., has taken the New England agency for the Grabowsky trucks.

THE DAVENPORT AUTO TRUCK COMPANY, Davenport, Ia., is building a \$7000 garage on Rock Island Street.

THE REGAL GARAGE COMPANY, of Spokane, Wash., has recently taken the agency for the Gramm trucks.

DEAN DE WITT, of Columbus, O., has been appointed agent for Knox commercial cars in the central Ohio district.

THE WESTON-MOTT COMPANY has opened a Chicago branch at 903 Marquette Building, in charge of C. J. Bayley.

THE EDWIN W. JENNINGS COMPANY, of Bridgeport, Conn., has been appointed agent for Lippard-Stewart delivery cars.

THE UNITED DELIVERY COMPANY, Paynesville, O., which operates a motor delivery, has added a general garage to its business.

THE WHITTEN MOTOR VEHICLE COMPANY, of Providence, R. I., has just taken the agency for the Lippard-Stewart delivery cars.

THE EVERETT MOTOR CAR COMPANY, of Everett, Wash., has taken on the agency for Adams trucks for the state of Washington.

NEELY & ENSOR, of Baltimore, Md., have just taken the agency for the Lippard-Stewart delivery car. They also handle the Alco truck.

THE ARGO ELECTRIC COMPANY, of Saginaw, Mich., has recently established a Chicago salesroom at Michigan Avenue and Twenty-fourth Street.

THE MICHIGAN MOTOR COMPANY, of Portland, Ore., has recently taken the agency for Lippard-Stewart delivery cars for the state of Oregon.

S. N. BORENIE, who was formerly western sales manager for E. R. Thomas Motor Company, now covers the same territory for the F. B. Stearns Company.

H. S. STEBBINS has been promoted to the position of Eastern sales manager for the General Motors Truck Company with headquarters in New York.

THE FELKER AUTO COMPANY, of Denver, Colo., has recently taken the agency for Mack and Saurer commercial cars for Colorado, Wyoming and New Mexico.

THE HYDRAULIC TRUCK SALES COMPANY, 1777 Broadway, New York, is the sole distributor of La France Gasoline-Hydraulic trucks, made by the American La France Company.

THE POLACK solid rubber tires for commercial cars, manufactured by the Polack Tyre Company, has established a Philadelphia branch at 408 North Randolph Street, in charge of M. Smolens.

FRED J. TITUS, formerly of the retail force of the American Locomotive Company, is now establishing agencies for the Alco trucks, and has recently returned from an extensive and successful Canadian trip.

THE UNITED STATES TIRE COMPANY, of New York, has recently adopted a radical change in its selling policy, in that it has retired from the retail field and will in the future only sell at wholesale prices from its twenty-six branches.

NEW LIPPARD-STEWART AGENCIES: The Sterling Place Garage, Brooklyn, N. Y.; Newark Power Wagon Company, Newark, N. J.; Ryder Motor Company, Poughkeepsie, N. Y.; W. H. Heinzerling, Sedro Wooley, Washington; Turk & Brown, Rochester, N. Y., and Dean De Witt, Columbus, O.

THE UNIVERSAL MOTOR CAR COMPANY, of Pittsburgh, Pa., has recently secured the agency for the Eclipse commercial car. This company was recently incorporated under the laws of Pennsylvania, with a capital of \$25,000. Present quarters of this concern are at 6115 Centre Avenue, and plans are being drafted for a modern garage and display room.

THE NEWARK AUTOMOBILE MANUFACTURING COMPANY, Newark, N. J., has elected the following officers: president, John T. Walsh; vice president, John W. Phillips; secretary and treasurer, H. V. Radovitz; directors, David King, Carl W. Johnson, W. B. Abbey, R. C. Crocker, C. A. Jones and B. Cuckor.

THE STEWART & CLARK MANUFACTURING COMPANY recently moved its Minneapolis branch from 45 South 10th St. to 1202 Hennepin Ave., where it will have larger and more convenient quarters. The new office will be in charge of T. J. Snelling.

THE R. & L. COMPANY, of Newark, N. Y., has recently been established as Eastern distributors of Garford trucks and pleasure cars. Temporary quarters are at 987 Broad Street. The company is erecting a four-story building, 60 x 100 ft., at Central Avenue and Halsey Street, which will contain showrooms, service department and stockroom. The branch is managed by Jack A. Ranier.

THE HEXTER MOTOR TRUCK COMPANY, New York City, distributor for Gramm trucks, has recently leased a large new garage and salesroom, at 427-31 W. 52nd Street, for a period of ten years. The entire building, which is 75 x 100 ft., seven stories, equipped with two freight and one passenger elevator, and up-to-date in every respect, is at the disposal of the company.

INFORMATION BUREAU

FREE SERVICE

Surely there is something special which nearly every one of our readers would like to know about commercial cars, or their use or care.

Our Information Bureau is ready to reply to all inquiries. Just write us stating fully what you want to know.

Address

Information Bureau,
COMMERCIAL CAR JOURNAL,
Market & 49th Sts., Phila., Pa.

CRITICISM OF W. C. REID'S PAPER

The following letter by the Couple Gear Freight Wheel Company, Grand Rapids, Mich., has reference to the paper by W. C. Reid, of the Lincoln Storage and Safe Deposit Company, of New York, published on page 55 of our February number. The point in this communication, that a prospective purchaser is very apt to remember a statement which is misleading, much longer than he will the actual figures, is we believe, well taken.

We appreciate hearing from our readers in this way, whenever they have criticisms or suggestions to make.

Editor COMMERCIAL CAR JOURNAL,

We want to compliment you upon the make-up and general appearance of your February 15th issue of the Chicago Show number, and in addition we want to comment on the article on page 55, entitled, "A good truck is known by its works, not its paint."

We fully believe that it is the intention and desire of every publisher of commercial car journals to give information to their readers that is not misleading, and this article, we think, is misleading and we believe that the printing of such articles injures the trade, for the man who is thinking of purchasing electric cars is quite likely to remember the statements which are misleading much longer than he will the actual figures given, which in this case contradict and in fact correct the statements made in the early part of the article.

In the first paragraph of the article Mr. Reed emphasizes the fact that he was particularly attracted to this manufacturer for the reason that he could secure a guarantee for a period of three years, that the cost of maintenance including battery, tires and all machinery did not exceed a sum of about \$5 per month, or in other words, give him something for nothing.

In the third paragraph he corrects this statement by giving figures which show that the average cost of maintenance of the five vehicles for the twenty-two months period between January 1st, 1910, and November 1st, 1911, was something over \$30 per month each.

The article states that this first wagon which was guaranteed to cost not more than \$5 per month was a one-ton delivery wagon. The third paragraph gives us the information that the delivery wagons were making an average of 25 miles per day. The average cost of tires for such an outfit per set to the consumer would be \$125 and the same would be guaranteed for 8000 miles. The expense for tire upkeep would, therefore, be 1½ cents per mile, or 37 cents per day, or approximately \$10 per month.

If the truck were really a one-ton capacity machine and was moved 25 miles per day, the cost for renewals of battery

would not be less than \$12 per month. This would leave us an item of \$100 per year for general repairs to that portion of the wagon exclusive of the battery and tires, including the painting, etc., which is a very conservative estimate. This brings the total cost per month for the operation of that wagon up to \$30, which agrees with the figures given in his third paragraph.

His letter is a very good one, but would have been much more fair to the manufacturer, as well as the trade, if the first paragraph had not been written, for in that paragraph are the glaring statements that would certainly mislead a prospective purchaser.

Truly yours,

COUPLE-GEAR FREIGHT WHEEL CO.,
J. W. Brown, Manager.

DRAFT HORSES USED IN THE U. S.

Bay City, Mich., February 14, 1912.

[210] I am desirous of procuring authentic data as to the number of draft horses employed in trucking service in various cities of the United States. TRUCK MANUFACTURER.

There are at the present time no available lists which show the exact number of draft horses used in the various cities throughout the United States.

It is estimated on good authority that there are 31,816,000 in this country and that the proportion of work horses to people in the cities is 1 to 38, and you can fairly and accurately estimate the number of horses used in any one city by dividing the population by the number 38.

We would call your attention to an article on this subject, published on page 14 of the December, 1911, issue of the CCJ.—Editor.

LIGHT TRUCK FOR FRUIT RANCH

Gentlemen:

[209] We have call for a commercial car for the West Indies for general use on a fruit ranch, where there will be light loads from nothing up to, say 1000 to 1500 lbs., but is wanted of such make and style as will permit of its general use in running into town, six miles, and for any other use of which it is capable. Our idea is, some car that will be between an out-and-out truck, and a passenger car; that is, something that can be used to take two or three persons anywhere the same as could be done with an ordinary express wagon, and make decent speed.

MAXSON & Co.

Westerly, R. I.

There are quite a number of very excellent machines of both the shaft driven and side chain type in the market, which will well answer your requirements of about 1500 lbs. carrying capacity; and it is a simple matter to have one or more detachable seats for the use of passengers when some are required.

These machines are capable of negotiating any grade with-in reason, and are generally fitted with either solid or cushion rubber tires. The speed of such vehicles would be in the neighborhood of from 18 to 20 miles per hour. The names of many of these will be found on our advertising pages.—Editor.



COMMERCIAL CARS BROADEN THE DELIVERY FIELD

Large Department Store Constantly Widening Its Field of Direct Deliveries by Use of Commercial Cars

The immense amount of territory covered by motor delivery vehicles seems to be the main argument that is compelling their adoption by progressive business concerns.

Not "how much gasoline will be consumed," but "how much more territory will I be able to cover," is the growing viewpoint of purchasers of motor trucks. And this broader aspect of the question appears to be more than vindicated by the business-building power of the motor-driven vehicle.

A significant instance of rapidly increased delivery territory is the case of Strawbridge & Clothier, of Philadelphia, whose suburban delivery routes are now almost exclusively covered by commercial motor cars. Recent reorders by this firm for four more Autocars, and several Garfords, also a Sampson, is an indication of the satisfaction the new method of delivery is giving. It was more than two years ago when Strawbridge & Clothier first made the experiment of delivering packages in motor-driven vehicles. They then bought two cars of the Autocar Company, Ardmore, Pa., and the results were so satisfactory that more vehicles of the same make were purchased a short time later. These cars are now all on pneumatics, or soon will be, as the company believes firmly in pneumatics for small commercial cars.

It is interesting to note the way in which these cars have displaced horses in the territories in which they are used, and the increased amount of ground which they cover. In the Main Line delivery route, for example, two Autocars have taken the place of ten horses, and cover fifty per cent more territory. Each car

travels from sixty to seventy-five miles per day, and the two cars deliver merchandise in no less than twenty-four towns between Philadelphia and Frazer.

In the territory north of Philadelphia, known as the Frankford district, one car has displaced four horses, which formerly covered five towns. This car, besides reaching these same towns, has added eight more towns to the route, and delivers merchandise in each town every day.

Department stores who use commercial cars say that one of the principal advantages is the ability to reach isolated homes on country roads between the various towns and villages. This naturally creates a broader field of business operation and establishes new business in territories that they never attempted to cover before with the use of the horse-drawn vehicle. It used to be



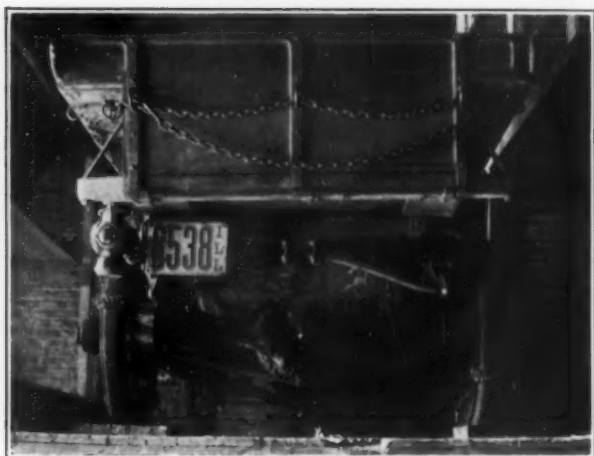
The Car Delivers Directly to Isolated Suburban Residences

the case that when horses were depended upon, the drivers would be unable to reach many of these houses, and the delivery of packages was unavoidably delayed. With the motor cars, however, it is easy to reach every customer and add new customers to your list, and even though it may be only a small package that is to be delivered, the driver thinks nothing of going two, three or five miles to carry it to its purchaser.



Two of These Cars Have Displaced Ten Horses on a Suburban Express Delivery and Cover Fifty Per Cent More Territory With Better Satisfaction to Customers.

Mr. Truck User: Did it ever occur to you that you could save quite a little money every year through the accumulation of a little knowledge about the trucks you are using. No, we don't mean that you should be a full-fledged mechanic or designer, but you should know something about the various methods some concerns employ in running their truck service. One of the best ways for you to acquire such knowledge is to read the COMMERCIAL CAR JOURNAL. Its pages contain interesting articles on the proper management of a truck service, descriptions of new commercial cars and the latest accessories and parts designed for trucks.



The live rear axle of this pleasure car which is used for commercial purposes has broken down three times due to use of solid tires, primarily. The driver is a good man and on his recommendation the pneumatics were replaced.

A CONVERTED PLEASURE CAR THAT FELL DOWN

The accompanying illustration is of the live rear axle of a four-cylinder pleasure car which is being used for commercial purposes. It is stated by the owners that a good man has been driving the car and that he is very careful. Also he had a few ideas of his own, namely, that to substitute solid tires for the pneumatics would result in economy. But did it? Hardly. The car was designed for pleasure purposes, and has a live axle, and when subjected to use as a truck and fitted with heavy tires that poor rear construction was abused and broke down. It will be noted that the rear housing has been braced by truss rods. This rear system has broken down three times since the solid tires were fitted.

It is worthy of note that in the same garage where this car is kept there are three others of the converted type which



Another Example of "Making Good"

Like a great many other large concerns, the firm of Arbuckle Brothers is vitally interested in the matter of commercial cars. Early in the year this company bought a five-ton, worm-driven, Pierce-Arrow truck and, in order that it might be given a trial under hard service conditions, sent it to Pittsburgh. That city is regarded as a particularly well-fitted ground for testing motor vehicles of any kind. Its cobble pavements, narrow streets, steep grades and congestion of traffic combine to bring out any weaknesses either in construction or adaptability for its work that the truck might have. Although a great deal of the work in Pittsburgh was confined to the delivery of merchandise of the kind shown in the photograph, the car was also used for heavy haulage of various kinds. After a trial of six months, Arbuckle Brothers thought so well of the performance of the machine that an order for three more of the same type was placed.

have gone to pieces, though they were in very good condition to begin with.

These four illustrations well bear out the contention of the truck designer that a pleasure car is one thing, a truck entirely different. Another point not to be overlooked is that initial investment in an out and out commercial vehicle, while it might perhaps be high, would have better served the purpose than the half lengths herein referred to. It cannot be denied that there are numerous instances of pleasure cars doing good work when used for commercial purposes, but in almost all cases the tire equipment is pneumatic.

DELIVERY SYSTEM SIMPLIFIED

An instance of simplification of delivery system is well exemplified in the service of I. S. Henkle, Union Stock Yards, Chicago, Ill. The simplification has to do with the Davis Laundry whose teaming is done by I. S. Henkle. As to details this is how the commercial car fits in.

Previous to the arrangement with Henkle, the laundry shipped bundles by express to an outside station from which point they were delivered according to routes by three horse teams. The collections were made from five outside towns, massed at the "sub station," as it might be called and there shipped to the laundry in the city. Now the Henkle Mercury cars deliver the bundles direct. The run to Lake Bluff is



Poland Spring House Finds Pope-Hartford Truck Indispensable

The famous Poland Spring House, in Maine, has found a three-ton Pope-Hartford truck indispensable for the transportation of baggage to and from the railroad station. The hotel is located five miles from the Danville Junction station, at an elevation of four hundred feet above it. During the time they have been using this truck Mr. Hiram W. Ricker, Treasurer of Hiram Ricker & Sons, proprietors of the hotel, writes that the truck has covered 3,724 miles; taking the place of three four-horse teams in the transportation of their baggage and express matter, besides handling a large amount of other freight in connection with their water business. "The heaviest load that has been on the truck from Danville Junction to the hotel is seven thousand pounds, it has made its trips regularly and with the same average speed, whether heavily loaded or not, and has never missed a train, or been stopped on the road from lack of power or breakage of machinery," Mr. Ricker writes in his letter. Aside from its practical value, this truck has enabled guests to have their baggage at the hotel when they arrive.

about 42 miles and the trip is made twice a week, the round trip sums up pretty close to a hundred miles. Four other days in the week the car runs from 60 to 75 miles a day. The commercial way eliminates three teams that the laundry had to operate under the old collection and delivery system. Two shipments by express are also eliminated for delivery is direct, the proper way, the time saving way.

The Care of a Motor Truck

BY HENRY J. BARBOUR



MOTOR trucks are now recognized as no longer in the experimental stage. Every day we hear of firms who have discarded the old "horse system" and accepted the modern power wagon, for both light and heavy hauling. Every day we hear of the success of the motor truck in some new field, in the country as well as in the city. But very seldom do we hear of the failure of the motor truck system, and if we do we are sure to be able to find some cause, other than the truck system itself, and the reason of the machine's failure can generally be traced to its driver. Most manufacturers take great pride in the construction of their trucks. They strive to put into them the best material suited for its special purpose. The machines are built and assembled under the most careful supervision. Men of ability and experience are employed, and after a car is finished it is given a final hard and severe test on the road. Therefore it must be seen that if a machine "falls down" when it gets into active service, it is generally the fault of the man who is driving it.

Now the troubles of a motor truck can generally be traced to poor lubrication, lack of care for the essential parts of the machine, and careless or bad driving.

Lubrication Information

Generally speaking, there are three kinds of oil used on a motor truck: first, a comparatively light oil for the motor and bearings; second, a heavier or nonfluid oil for the gears and wheels, if they are fitted with roller bearings and, lastly, a hard oil or grease for the transmission and differential. Graphite, if very finely divided, can be used to advantage.

Beginning with the engine, we find that inside the engine, cylinder oil is used. It is best to use the oil for which the car was designed, or that recommended by the manufacturer of the truck. Now, there are at least a dozen first-class oils on the market and any of them can be used without anxiety, but every cylinder oil must have the following characteristics:

It must be noncarbonizing, that is, it must not deposit a layer of carbon in the combustion chamber.

It must not become gummy. It must be of the greatest body or viscosity possible, yet will permit a uniform feed all the time, disregarding the temperature.

It must be able to retain its normal body while in use and must not turn into a thin or watery substance.

It must also be "slippery" enough to allow all the working parts to move smoothly, readily and easily.

It must never contain any gritty foreign matter which will "furnish" the bearings.

It must contain no acid.

Cylinder oil with these qualities will certainly not cause any trouble. When running the engine, always see that the cylinder oil is at the correct height in the crank case. If there is a circulating pump in the crank case, it must be seen that the pump is in good working order, otherwise, the engine is liable to overheat, the piston stick to the walls of the cylinder, and the result is a burned-out engine, which will have to be bored out again to become of any value.

The next thing to be considered is the oiling of all the small gearings and roller bearings and compression cups. These should

be oiled twice a month with a heavy or semi-fluid oil, but not as hard an oil as that used in the larger gearing. This, like all oils, should be free from any gritty matter and must be able to stick to the gears. On all the wheels and other bearings there will be found oil cups. These should be filled at least once a week with this oil and screwed down firmly at each trip, so that a new layer of oil is forced upon the bearings each time. That a tremendous amount of energy is exerted in the heavier gears, such as the transmission and differential, is self-evident. It has been proved that close to a half million foot pounds are exerted on every tooth of the transmission gears in one minute, when the truck is traveling at the rate of about twelve miles per hour. Think of it. A force on each little metal tooth sufficient to raise five hundred thousand pounds one foot in one minute. Since this is so, the care and the oiling of the transmission and the differential can be seen to be very important. Without oil the friction and heat would be terrible. Therefore, an oil of certain good qualities must be used. It must coat the working parts at all times and absorb the friction. It must cling tenaciously to the gears regardless of the heat or cold, yet at no time become gummy or resinous.

Changing Gears

It is a bad policy to allow everyone to drive a truck, because each individual drives a car in a little different manner from another, and the different mode of the shifting of gears in the transmission causes them to wear out quickly. However, if one is careful to have the clutch pushed entirely out, he will have no trouble with the changing of speeds. A great many drivers change speeds with the clutch *partly disengaged* and *stripping of gears* is the result. If your clutch is in the habit of "gripping," "slipping" or "spinning," it should be attended to at once. "Gripping" is due to faulty mechanism, too tight a spring tension, or the lack of oil. "Slipping" is not dangerous, but is the cause of much annoyance and loss of time, and power transmitted to the driving wheel. The causes are either insufficient spring tension or a greasy surface (if the clutch is leather-faced). In the first case, the spring can be tightened, but in the second case French chalk should be used to get rid of the grease. "Spinning" clutches are so called when the clutch-driven shaft continues to revolve after the clutch is disengaged. It causes a series of blows on the teeth of the gears in the transmission, which is very destructive. Some manufacturers fit this member with a clutch brake.

Brakes

There is an old law in physics which reads something like this: "A body in motion tends to stay in motion; a body at rest tends to stay at rest." This is true of a motor truck. A truck in motion tends to stay in motion and it will do so until stopped by friction, either the friction of its parts, or applied friction. Applied friction is furnished by the brakes, and the brakes, to be of any value, must be effective and dependable. A large brake surface is desirable. No three-ton truck should have less than 450 sq. in. of brake surface. A light truck weighing 1½ tons, going at the rate of 20 m.p.h., exerts about 50,000 ft. pounds of energy. To stop this truck in five seconds means that from 14 to 15 h.p. must be

**Trucks are like fire and water, good servants but bad masters—
hire a competent driver**

absorbed by the brakes. Now, braking creates intense heat, and, therefore, if the braking surface is small, the pressure per sq. in. is greater, and the brakes are liable to "burn up." The larger the brake surface, the less the pressure per sq. in. and the less tendency to "burn." It might also be said here, "the larger the brake surface, the less the brake troubles."

Cotter pins in the brake rods should also be inspected, to see that none are lost or broken. If the brake surfaces are leather, camel's hair, or some other belting, oil should not be used on them; but if the surfaces are metal against metal, they should be oiled often to prevent "furrowing."

Brakes should not be overworked or strained unnecessarily. How many truck drivers go as fast as they can until they almost reach the desired spot, then "jam" on all brakes and slide the rear tires. It is absolutely uncalled for. A good, careful driver seldom uses his brake, but slows down gradually. On an incline, it is best to use each set of brakes alternately. But in ordinary driving it is almost unnecessary to use the brakes. All slowing or starting can be done by retarding or advancing the throttle.

Care of Tires

Tire trouble is another thing that keeps the cost of a motor truck up, but a heavy tire expense is generally due to a poor or careless driver. A few given rules can be laid down for this:

Don't allow oil to get on the tires or allow the truck to stand in a puddle of oil.

Don't start or stop the car with a jerk.

Don't round corners at a high rate of speed.

Don't unnecessarily turn sharply.

Don't turn the steering wheel while the car is at rest.

Expense of the rear tires may sometimes be due to the fact that the radius rods, not being adjusted an equal amount on each side of the truck, the rear axle is not at right angles to the driving chains and not parallel to the countershaft. Wear on the driving chains will become evident if this is the case. This fault can easily be remedied by tightening or loosening the rods.

More troubles are due to bad driving than to any other cause. "It is fool's economy to put a five dollar a week boy on a five thousand dollar truck." "The more easily a motor truck is started the better it is for the life of the car." In stopping it is the same. Stop gradually.

In changing gears, observe the following rules:

Throttle down the engine.
Disengage the clutch entirely.
Shift your gears steadily.

After the gears are shifted, engage the clutch slowly and advance the throttle until the engine reaches its normal number of revolutions.

When you come to a hill, change the higher speed to a lower one as soon as the truck begins to slow down. Don't change speeds after you have "stalled" the motor; also, don't change too soon, for that is almost as bad as too late.

Keep your truck as near its original efficiency as possible, by using plenty of good oil and common sense.

DELIVERY SERVICE BETTERED

Realizing the necessity for prompt delivery to their trade, of dyestuffs and chemicals, the Eaton-Clark Company, Detroit, Mich., installed a two-cylinder gasoline car some time ago, and later a 1½ ton electric truck. The results are very satisfactory, according to a statement given out at the offices of the concern, and the delivery system has been much improved.

The electric car is cared for by the company, while the gasoline truck is kept in order by the maintenance branch conducted by the makers.

LOW UPKEEP SERVICE

A passenger-carrying automobile service between Cairo and Leeds, N. Y., is being maintained by S. E. Cozine, Jr., of Cairo, at an average cost of 1½ cents per mile for tires, gasoline and grease. The car used is a Franklin 18 h. p. model, and the total distance covered to date exceeds 70,000 miles. During this running, the average mileage per gallon of gasoline has been 17.5 miles, and this includes service all the year around.

MOTOR 'BUSES IN MEXICO

A company headed by Dr. Samuel Espinosa de los Monteros, of Mexico City, has been granted a concession by the government to put into operation in that city a number of double-deck motor 'buses and horse-drawn stages, as a means of relieving to some extent the transportation difficulties in Mexico City. The concession requires that not fewer than ten vehicles be used at the start. It is stated that the company intends to commence with four motor 'buses and six horse-drawn stages.

A. AMBLER, a California contractor, is using a six-ton Commer truck in hauling gravel, at the rate of five yards to the load, the gravel weighing 2600 lbs. to the yard, approximately. The average haul for this job is four miles round trip. At the rate of fifty miles per shift, or one hundred miles per double shift, it will carry twenty-five loads per day of sixteen hours, or 125 yards. This, at the rate of from \$1 to \$1.10 per yard, gives a very handsome profit, and indicates the possibilities of the truck as an earning machine.

THE MOSLER SAFE COMPANY, of New York, after fifteen months' service of a five-ton Sampson truck, has ordered a second Sampson, insisting that absolutely no changes be made in the truck. Both vehicles are equipped with windlasses, operated by the power of the motor, enabling the crews to lift the heaviest safes in much less time than is required by hand power.



Always a Year or Two Ahead—

"Firestone"

Truck Tires AND Rims

The Only Complete Line of Tires for Every Service—The Only Truck Rims for Quick Tire-Changing that have Passed the Experimental Stage

WE ANNOUNCE the addition of several heavy-service tires, completing a Firestone line of designs to exactly suit every type of car, size of load and condition of service—and every tire a proven success. On regular rims, or on Firestone Quick-Removable Rims, for quick tire-changes right on the spot.



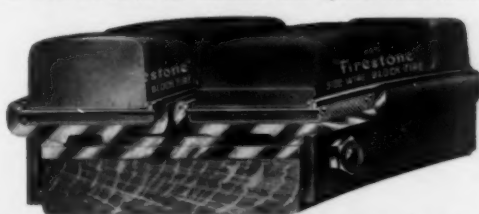
Single and dual Heavy Duty tire for resiliency. Economical in car up-keep. S. A. E. Standards. NOTE: Both dual tires can be taken off without removing the wheel.



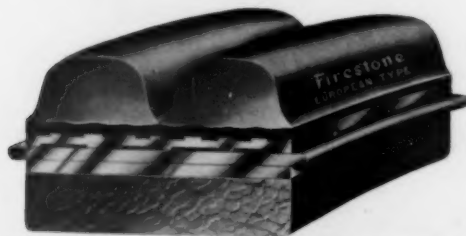
Cushion and Special Electric tires for Electric Pleasure Vehicles, Electric Trucks and Light Gasoline Delivery Wagons. Extremely resilient, and economical in current consumption. Rims for Cushion Electric tires are interchangeable with pneumatic rims. Special Electric tires made in Old Standards to fit channel rims and in the S. A. E. Standards to fit channel and Quick-Removable Rims.



Hard Base—channel type for heavy service. S. A. E. Standards



Block tire for traction and non-skidding in heavy service. Economical in car up-keep. Old and S. A. E. Standards.



Hard Base—European type. Has a tough, resilient tread and a metal-and-hard-rubber base. S. A. E. Standards only.



Many years of undisputed leadership in Quality, Design and Volume of Output have particularly qualified the Firestone Company to offer this only complete line of fully proven tires and rims.

More than one hundred service stations throughout the United States

WRITE FOR OUR GUARANTEES

THE FIRESTONE TIRE & RUBBER CO., AKRON OHIO

"America's largest exclusive tire and rim makers"

Milk Dealer Uses Mixed Service of Gasoline and Electric Cars Successfully



PROMPT deliveries, whether they are made by horse, commercial cars, or through shipping agencies, are essential to business success. It matters little what the business may be, deliveries must be made on time. The purchasing public no longer carries its own bundles, rather lets the seller attend to that part of the transaction. "Have it sent," has become the slogan throughout the universe—and why not? That concern, regardless of the line of business or the class or equipment employed, which cannot make deliveries promptly, loses the business—which goes to the individual or concern which can do things as they should be done. If a man buys a suit of clothes, he wants them sent; he wants them on time, not a few hours or a day later. When the lady of the house orders the supplies from the grocer or the butcher, for the noonday meal, she wants them on time; otherwise there is a late meal and an exasperated head of the house. It is meeting the requirements of customers by the tradesmen that makes a business worth while.

Transportation managers who have cast about for a more improved and efficient method of transportation of merchandise, have found none better suited to general conditions than commercial cars; and of all classes of users of motor trucks, sight must not be lost of the dairymen as factors in the use and exploitation of this sort of equipment. A satisfactory commercial car is a big asset with a wide-awake dairy manager; he has deliveries to make; it is expedient that deliveries of milk, cream and butter be made without loss of time, especially in the summer, for dairy products are perishable and very susceptible to climatic changes. This sketch is inspired by a Middle Western service, a mixed service, hardly notable for the number of cars used, but more because of the manner in which the work is done. Towar's Wayne County Creamery, Detroit, Mich., is a factor in the dairy trade in that thriving city of the straits. Detroit has, approximately, a population of a half million, and of this, there are many followers of Towar's products. Detroiters, like all others, want their cream fresh and sweet for the morning coffee; and a peculiar feature of the situation is that it must be had much earlier than in some cities. Strange as it may appear, Detroiters too, are strong on milk drinks; so that the sale of this liquid

is heavy at all seasons of the year, especially at noontime, among the factories. This is borne out by the fact that the Packard, Hudson, Chalmers and Lozier factory employees keep the Towar three-ton gasoline trucks busy hauling over the milk in bottles for the noontime meal. So much for the demand; it exists; it is strong; the Towar forces have their hands full tending to business, and the commercial car is a most valuable agent in transaction of that business.

The writer inquired recently as to the quality of service which exists here, and the reply was most encouraging. The equipment at present is a three-ton Packard four-cylinder

gasoline truck and a $1\frac{1}{2}$ ton Walker balance-gear electric delivery wagon. The owners state that current for the electric costs one-half cent a mile; the car averages forty miles a day; the vehicle, having been recently installed, has not, of course, had to be overhauled, and is not likely to be for some time to come. But the big end of the deliveries falls to the lot of the gas car, by reason of the unlimited radius of action.



Fig. 1. Electric One and a Half Ton Wagon; used for special delivery for city service

Twenty-two Hour Service

It is obvious that a truck in dairy service is likely to be called upon to do heavy work. Towar's service is no exception. The big truck leaves the main plant with a four-ton load at 3.30 every morning. Early? Well, rather; but then, as explained above, Detroiters need that cream for their coffee; and, what is coffee good for without the cream?

The start is through the wholesale district and the vehicle is on the move until 10.30; the drivers breakfast at 9 a. m. At 10.30, the morning trip is concluded; and at noon the early morning crew, having done a day's work, is relieved, and then another takes its place and is on duty till midnight, or shortly after, as occasion may necessitate. On the morning run, the load is reduced after about three-quarters of a mile out from the main plant. It will be noted that the car is not idle many hours out of the twenty-four; in fact, the owners state that the average working day is twenty-two hours, with two shifts of men.

Feeder for Substation

The large truck is a feeder for the north end station, located on North Woodward avenue, about three and a half miles from the main downtown plant. Eight tons of milk are carried to this station in two trips, the route all the way out being up grade slightly and over asphalt. The round

trip for
hour
and w
of wo
much

Drive

On

Towar
has le
ating
is han
cal t
driven
work.

trary,
men o
ter m
ments
each m
to at
own v
inter
other
the dr
ting th
livery
for the
keep t

As
tive; i
return
much
tions o
been s
are rea

The
service
long h
Detroit
Sunda
run ou



Fig. 2. Sun

trip for the car is about seven miles, and it is done in an hour and a half. It would take a team four hours or more, and would require four teams, in fact, to do the same amount of work. This implies that the truck will do four times as much work.

Driver and Delivery Man

One thing the Towar organization has learned in operating cars, is that it is hardly economical to have the driver do all the work. On the contrary, having two men on the car better meets requirements and gives each man a chance to attend to his own work without interruption; in other words, while the driver is operating the car, the delivery man, like a mail clerk, is having things set straight for the next stop, and has time to adjust his records and keep them straight. This saves time for all concerned.

Load Each Way

As in brewery service, the Towar cars are doubly effective; in other words, they have a load each way; so that, returning with a full load of empties, about one-half as much weight is brought back as was carried out. Collections of empty bottles have to be made, and the service has been so arranged that when deliveries are made the empties are ready for return to the main plant.

A Thirty-two Mile Haul

The most interesting feature of the Towar large car service is that the vehicle is used to good advantage for long hauls. At New Hudson, thirty-two miles out from Detroit, there is maintained a receiving milk station. On Sundays and holidays the three-ton gasoline car makes this run out and back in six hours. It could not be done with

horses, as it means sixty-four miles in a day. The average running time is 10.6 m.p.h., and the roads, most of the way, are fairly good, patches of sand here and there,—yet such as to be negotiated, though the driver, of course, has to know his business.



Fig. 3. A Side View of the Car Shown in Fig. 2, All Loaded and Ready for a Run. The side entrance greatly facilitates delivery, and the speed insures the milk arriving in good condition

It may reasonably be asked why this trip is made on the week-end and on holidays. This is necessary, for the reason that the railroad over which the milk is shipped on week-days, does not operate on Sundays and holidays. But the run can be made with the car and effect a saving. To buy the service would cost \$15; that is, a Detroit commercial car agency will supply a car for the trip for \$15.

Cost of Freight Shipment

On these trips, sixty-five cans of milk, weighing 110 lbs. to the can, or 7150 lbs., which is 3.58 tons, is carried. The same load is sent by freight on weekdays. Now then, the road makes a charge of twenty-four cents for each can of milk shipped, so that the sixty-five cans cost the dairymen \$15.60, and then there is a haul at one end at least, at Detroit. Getting down to ton mile figures, the railroad service costs 13.6 cents per ton mile. The cost of shipping one ton thirty-two miles is \$4.36; the price per can, as above noted, twenty-four cents.

Cost of Car Shipment

Now, that same load can be transported by the three-ton commercial car for \$8.55, or the cost of one ton for the same distance is 2.39 cents, while the cost per ton mile is about 7½ cents. The cost per can by this method of shipment is 13.10 cents, as against 24 cents for rail shipment.

How it is Estimated

He who reads this sketch will, of course, want to know how the cost per car shipment is arrived at, and here it is. In computation there is considered: gasoline consumption, oil used, driver's wages, insurance, garaging, depreciation at 15 per cent. per year, interest at 6 per cent., and tire cost. Following the items are tabulated:

DAILY COST FOR 32 MILE HAUL	
12 gal. gas. at 9.5 cents per gallon.....	\$1.14
3 qts. oil at 32½ cents per gallon.....	.24
Tire expense.....	1.00
Driver.....	2.57
Garaging.....	1.00
Insurance.....	.41
Depreciation at 15 per cent. on \$3800....	1.56
Interest on investment 6 per cent.....	.63
Total.....	\$8.55

It must be borne in mind that the Towar is a seven-day service. Gasoline consumption is estimated at twelve gal-



Fig. 2. Showing Method of Loading. This car makes a sixty-four mile run Sundays and holidays, when the railroad does not run freight trains

lons, and three quarts of oil are used. In the matter of tire expense, \$1 per day is set aside. The actual cost of tires in the past twelve months has been \$310, including all four wheels. Such repairs as have been made cost \$75, which would add about 20½ cents per day to the cost above. The driver is paid \$18 a week, that is, the one who makes this trip, and garaging is estimated at about \$1 per day. Insurance costs forty-one cents per day, and covers all features save fire. Depreciation is estimated at 15 per cent., and this is figured on the original cost of the truck, which has now been in service for a year,—\$3800. The interest on this investment is figured at 6 per cent., which is more than could be realized on the money involved were it put out at interest, unless invested in some well-paying stocks. Now then, in consideration of the items above, we have a total cost of \$8.55 for the car in six hours work. Now this is rather against the car, in a way, so as to be on the safe side, some things are purposely set higher than need be. But suppose that there were to be added to this total cost a couple more dollars: the result would still show well in favor of the commercial car here used. In other words, it beats the railroads. Rail freight traffic managers have never been known to give anything away, and doubtless do not when they charge twenty-four cents for a can of milk. The thing to consider here is that, Towar's dairy would be in a bad fix were it not for this three-ton truck. Winter conditions alter the case, as the shipments are not then made at all. We have here, in this service, a good example of long-distance work, for which commercial cars are especially well adapted, as has been frequently set forth in this publication.

Driver Cares For Car

The three-ton gasoline car is cared for by the night driver, who is paid \$18 a week for seven days' work. He is



RAILROAD COMPANIES AND COMMERCIAL CARS*

The perplexities of the railroad manager of the present day have been shifted from the establishment and maintenance of the line to the arrangement of terminal facilities. Mr. Arthur Corthell, chief engineer of the Boston & Maine, has stated that more than half of the expense of handling freight traffic is due to the congestion of terminals.

In many cases, the extension in area of terminals is impossible, either physically, or because of the enormous expense which would be entailed. Could any device be employed which would expedite the handling of freight, it would manifestly serve the same purpose as an extension of terminal area.

In a recent issue of the *Engineering News* the question of the economical handling of freight in New York City is discussed. It is pointed out that the elevated structure on West street, proposed by Commissioner Tompkins, would not improve conditions greatly because of the traffic congestion which would occur at the distribution centers. The editorial continues:

"We are on the threshold of a revolution in the haulage of freight through city streets. The horse-drawn truck is soon to be replaced by the motor-driven truck; and for the most economical use of the motor-driven truck it is essential that large loads shall be carried. It is probable that a few years hence will see in com-

a good man and the truck is always on the move. In all the time that the car has been in service, the owners state that results have been satisfactory. The car shown in the accompanying cuts is fitted with a special body, which is 14 ft. long. It is one of the largest cars in use in Detroit.

The Electric

The Walker balance-gear electric, of 1½ tons capacity, shown in the accompanying illustration, was recently put in service and is doing good work. This is primarily a city car, and is used in going about with special orders of dairy products. It would take two teams to do the work of this vehicle, which is in service from six o'clock in the morning until the same hour in the evening. If a special order is sent to the office for a load of cream, milk or butter, this car cares for it. It is also used in sending out butter to the wholesale trade. The average daily mileage is forty, current, as before mentioned, costing one-half cent a mile.

Light Cars Set Aside

In a service of this sort, a car must be well built and be ready for service at all hours. If it fails occasionally it is hardly worth consideration. The concern recently set aside five single-cylinder gasoline cars because they were too light for the work to be done, and usually they were overloaded. The contention here is that it is better to use just the larger car suited to the work than to employ a number of smaller units. In this work one effective unit means much.

But, viewed from any angle, the Towar Creamery executives regard their service as quite satisfactory. A system of keeping track of car costs is about to be installed. Such figures as are here shown were "dug" out, but are approximately correct.

mon use motor-driven trucks capable of carrying from five to eight tons of freight through city streets at good speed.

"While there are, perhaps, comparatively few shippers whose business is sufficiently large to enable them to make economical use of such trucks, a freight terminal company could operate such vehicles and handle freight from the car to the warehouse, and *vice versa*, at far lower cost than is involved in present methods. If their freight can be handled by such vehicles, the next step will be to reduce to a great extent the movement of freight cars across the North River on floats and deliver goods instead from the warehouse in New York directly to the freight houses of the various railways located on the west side of the river. With horse-drawn vehicles it would not be possible to cover such a distance with such loads economically. With motor traffic the condition is entirely altered."

Facilitating receipts and deliveries would not only lead to satisfaction of the shippers, and diminish demurrage on waiting cars, but would add materially to the earning power of the railroad itself.

It needs no argument, therefore, to prove that the introduction of an effective means of mechanical haulage is looked upon most favorably by the railroad companies.

*Extract from paper by Robert L. Niles, M. E., New York City

FROM ACROSS THE WATER



Trailers and Commercial Cars in Europe

BY OUR FOREIGN CORRESPONDENT

Motor Road-Train Working

IN THE article on trailer costs in a former issue of THE COMMERCIAL CAR JOURNAL a promise was made to give some example of costs of working road trains. Let me therefore give a brief outline of the train from which these costs were obtained.

The original was brought out by Col. Renard and made in France under his name. The Daimler Motor Company have, however, now taken up the manufacture, and are supplying these trains to various parts of the world.

A Brief Description of the Road Train

The train consists essentially, at the front, of a leading four-wheeled vehicle or tractor, fitted with an 80 h.p. engine, which not only propels the tractor itself, but also drives a flexible shaft carried the whole length of the train.

The train is made up of six-wheeled vehicles, each having the center pair of wheels driven indirectly through the medium of a balance-gear counter shaft and side chains by the universal-jointed shaft, that is carried the length of the train, as already mentioned. Thus the adhesion of a certain proportion of the weight of each truck is available for driving purposes, and it is claimed that, while much greater loads can be carried, far less damage is done to the roads

than with a single pair of driving wheels. The wheels at each end of every vehicle in the train are for steering, on the same lines as in the front wheels of a car. The requisite amount of movement being imparted to them at each end by any angular side movement of the drawbar, when the vehicle in front begins to turn around a curve. As soon as this happens, the steering wheels on the car behind at once

go into action, and thus every car is made to do track with the one in front of it, and all with the tractor.

This, simply speaking, is the principle on which the Renard train works, but many complicated problems have had to be solved in its design.

An example of one of the simplest may be given. When "coiling up" on a curve of decreasing radius, the distance along the curve between two consecutive driving axles diminishes, but when straightening out the distance increases. Thus when beginning to negotiate a curve the trailing vehicle would tend to slip forward, and when the train was straightening out, backward. To counteract this tendency spring drives are introduced into the hubs of the driving wheels, so that the wheels overrun, when necessary, the part from which the power is applied.

Another very important point lies in apportioning the weight of the cars, so as to give all wheels a very fair share regardless of road inequalities.

Costs in Mail Carrying

The first example of costs that may be cited, were carefully worked out on one occasion when a road train at Bombay was employed for carrying the mails brought out by the steamship "Persia," and took them from the Apollo Bunder to Victoria station, and to the Bombay General Post Office, on the 18th of December, last.

The train was made up of a tractor and three wagons, having a combined tare

weight of thirteen and a half tons. Two journeys were made to Victoria station, a distance of 1.4 miles, at an average speed of 8.4 miles both ways, the load averaging 487 mail bags. As an example of the working, the steamer was signaled at 6.25 a. m., anchored at 6.40, mail launch arrived at the pier with first load of mails at 7.50, and the first of the 450 mail bags of the first load



The Renard Train Belonging to Messrs. de Roubaix Oedenkoven & Company, Which Has Given the Results Described in This Article

was put on the road train at 7.52, and the last at 8.17. At 8.27 the road train arrived at Victoria Station alongside the Punjab mail train, and half a minute later the first bag was put on the latter. The average unloading times of the two trips worked out to twenty-two minutes—a rather slow result due to the fact that the bags, instead of being thrown off the train onto the ground, had to be placed each on the top of a coolie's head for carrying to the mail train, and the number of coolies was insufficient.

From the pier to the General Post Office, five separate return journeys were made with large boxes and baskets measuring 4 ft. by 1 ft. 8 in. by 1 ft. 6 in. In this case the average load of 185 boxes amounted to fifteen tons, which were carried by the train at a mean speed of 8.3 miles an hour. During the entire day's work the speed, loaded and unloaded, was practically the same, because it was found necessary when running light to keep the speed down to prevent the wagons from jumping too much. In all, 17½ miles were covered at an average speed of 8.35 miles an hour and with a consumption of 1.9 gallons per mile. This last figure is equivalent to 28.02 net ton miles per gallon, or 53.67 gross ton miles per gallon.

The running expenses are given as follows:

Total Cost of Day's Running

Gasoline, 10 gallons @ 20 cents per gallon	\$ 2.00
Driver @ 90 rupees per month	1.00
Assistant @ 30 rupees per month	.33
Oil, waste, stores, etc.	.66
Repairs, 5% on capital; 300 days to the year	2.40
Depreciation, 20% on capital; 300 days to the year	9.60
Total	\$15.99

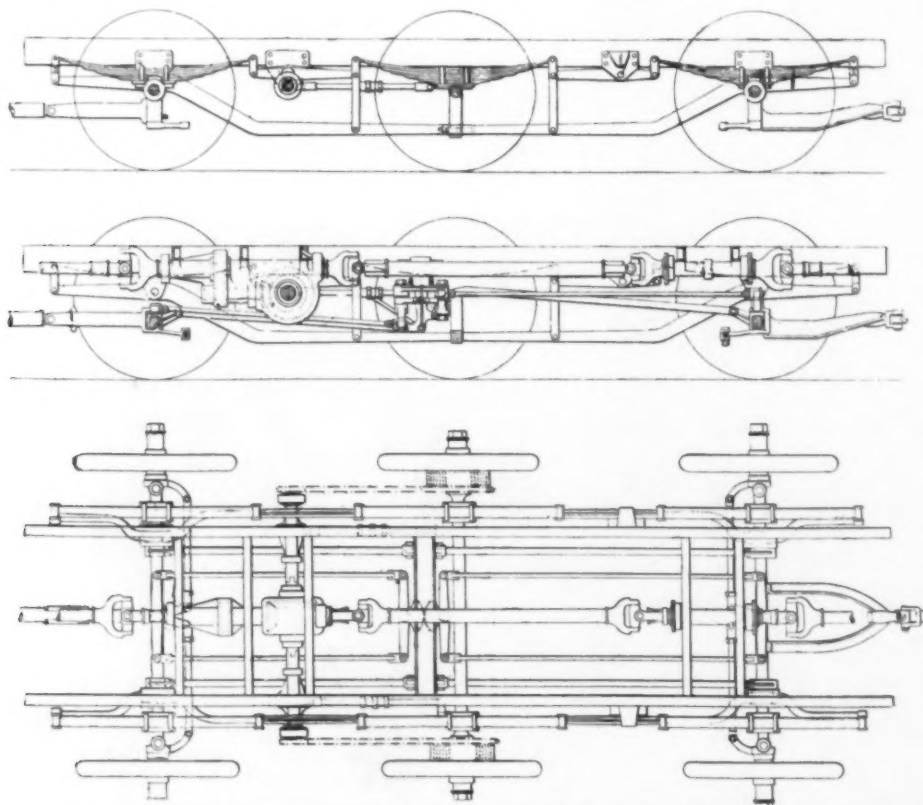
Now these conditions of working were very far from advantageous to the train, which was only actually running

about a fifth part of the day's work. Far too much time was taken up loading and unloading, and under the circumstances the depreciation allowed in the above accounts must be regarded as more than ample. As, however, such items as interest on capital, insurance and supervision are not included, the overestimate of depreciation may be set off against their omission.

Now let us compare the performance of the road train with the only other available means of transport, the bullock cart. To carry the mails taken by the single Daimler train from the Apollo Bunder to Victoria Station, forty-nine bullock carts would have been required. The original contract for this amounts to 1.4 rupees per cart. To do the road-train work from the Apollo Bunder to the General Post Office would have involved the use of 154 bullock carts, which, at the contract rates, would have meant a sum of 53.12 rupees.

Cotton Carrying in a Hurry

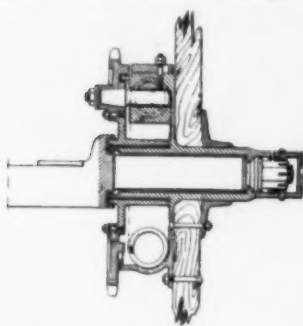
About December fifteenth, last, Messrs. Ralli Brothers were in a great hurry to have some bales of cotton taken from their Colaba depot to the docks, as the steamer was due to leave on the morning of that day and bullock carts did not provide sufficiently fast transport. Accordingly, a Daimler road train was requisitioned for the work, and within six hours five return journeys of six miles were completed and four hundred bales of cotton, weighing ninety tons, transported. All these trips were done practically dead to time, none varying from others by more than a minute. The speed for the outward journey, loaded, averaged 9.4 m.p.h.; for the return, unloaded, 9.3 m.p.h. At no time did it exceed 10 m.p.h. And yet to move this ninety tons six miles by road occupied but half a night.



The Renard Road Train: Plan and Side Views; showing the flexible driving shaft which drives the center wheels

The cost of the work, including depreciation at 20 per cent., repairs at 5 per cent. and all running expenses, amounted to \$10.88; in other words, 2.1 annas (just over four cents per ton mile). Had animal haulage been employed the cost would have been worked out to about \$50, despite the fact that at the time bullock-cart rates in the Colaba districts were exceptionally low, as it was the slack season, only 12 to 16 annas (24 to 32 cents) being charged by day and double that amount for night work.

Another example of the working of this train for Messrs. Ralli Brothers was afforded on the 4th of January, when a double distance of 30.8 miles was afforded by five separate journeys, each of 5.13 miles. Outwards the average load was eighty bales, or sixteen tons; on the return the train



Section of Hub: showing compensating spring drive in the driving axle of Renard train followers.

ran empty. In all, 480 bales were carried at an average speed of 7.34 m.p.h., while unloaded the average speed worked out at 7.52 m.p.h. In the course of this work, the consumption was given at 1.92 miles to the gallon (30.72 net ton miles and 56.64 gross ton miles a gallon). The expenses on the same basis as those already given, amounted to \$12.76, and thus the cost per ton mile is 4.8 cents, as nearly as may be. Bullock carts on the same work would have cost 12.4 cents.

Some four years ago, The Renard Road and Rail Train Corporation supplied one of their road trains to Messrs. de Roubaix Oedenkoven & Company, of Antwerp, and a month's tests were subsequently made to see how it compared with their forms of transport. As a result, the owners decided to give up horse traction in favor of the road train.

Here are the actual daily expenses in Antwerp for a train with one tractor and two followers:

Gasoline, 17.5 gallons per day @ 24 cents per gallon	\$ 4.36
Driver, 5 francs per day	1.00
Assistant, 3.50 francs per day	.68
Repairs, 2 1/2% on capital of \$9280; 300 days to the year	.74
Depreciation, 20% on motor; 300 days to the year	3.80
Depreciation, 20% on two followers; 300 days to the year	2.32
Lubrication and sundries	.48
Total	\$13.50

The train was not working under the most advantageous circumstances, for the distances were short and the stoppages numerous; but even so, when the train was running thirty-two miles, performing five return journeys daily, the cost only worked out to 4.6 cents per ton mile, while averaging 38.4 miles—six return journeys daily—it was only four cents to the ton mile.

With three followers the detail costs were as follows:

Gasoline, 17.5 gallons per day @ 24 cents per gallon	\$4.36
Driver, 5 francs per day	1.00
Assistant, 3.50 francs per day	.68
Repairs, 2 1/2% on capital—\$11,040; 300 days to the year	.88
Depreciation, 20% on motor; 300 days to the year	3.80
Depreciation, 20% on three followers; 300 days to the year	3.50
Lubrication and sundries	.48
Total	\$14.80

giving a ton-mile cost of 3.4 cents on the five-journey basis, three cents for six journeys daily. To study the influence

of the number of followers and number of journeys among the following table is instructive.

	Per day	Per ton mile	Journeys per day
With two followers	\$13.50	4.6 cents	5
With two followers	14.14	4.0 cents	6
With three followers	14.80	3.4 cents	5
With three followers	10.00	3.0 cents	6

Here again we find no allowance made for interest on capital, insurance, supervision, or accommodation, but it is probable that, under favorable working conditions, the 20 per cent. depreciation might go a long way towards covering these items. It only remains to be added that the punctuality with which each journey was performed was perfect.

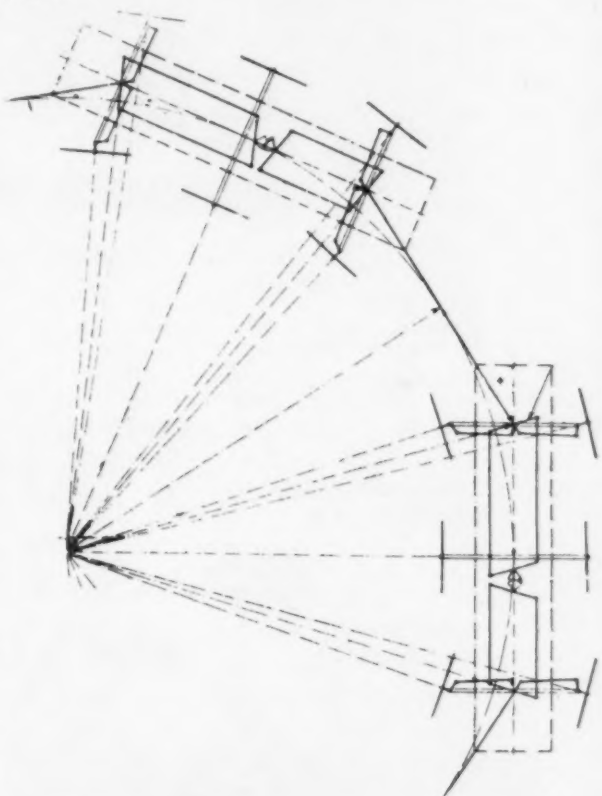


Fig. 10. Diagram Showing the Position of the Steering Gear on Trailers of the Renard Train, When Rounding a Corner

The foregoing tests were carried out some four years ago, but Messrs. de Roubaix Oedenkoven & Company have kindly furnished me with particulars as far up to date as possible. I give it in the form they have given it to me, only converting metric into American measure.

Comparative Figures for 1909 and 1910

	1909	1910
Working days	291	275
Total number of journeys made	1,495	1,305
Total number of loaded trucks	3,383	3,226
Total weight carried (pounds)	28,788,577	28,040,682
Distance covered (miles)	8,590.5	7,694.2
Consumption of gasoline (gallons)	6,702	6,520
Consumption of lubricating oil (gallons)	153	214
Total length of journeys made, in hours	2,536	2,342
Total number of ton miles	35,558	34,542

As regards the wage costs, these, it will be noted, are very low; but it should be remembered that labor is cheaper in Belgium than in any other country of Europe.

The Federal Is Just One Year Ahead in Quality, Reputation and Price—\$1800



Federal One-Ton Truck Chassis, 110 inch wheelbase, including driver's seat, \$1800. Body type at purchaser's option.

Wheelbase, optional 110 or 144 inch; Motor, 4 cylinder, 30 H. P.; Magneto, high tension; Clutch, 16 inch cone; Transmission, three speeds forward and one reverse; Timken bearings in wheels; Tires, solid, 36 x 3 1/4 inch front—36 x 4 inch rear.

In Quality, Reputation and Price the Federal leads all Standard one-ton trucks by one year.

There will be other \$1800 one-ton trucks next year. The Federal will have imitators in plenty.

But next year, and the year after, and always, the Federal will remain the best standard one-ton truck **at the lowest price.**

When you buy a Federal today, you buy a truck that is the Accepted Standard of Truck Efficiency, Truck Reliability and Truck Economy—and you buy it for \$400 to \$500 less than the price of any other truck of the same rating.

In meeting every hauling test, in solving every delivery problem, in selling at the smallest margin of profit—

Federal trucks are guaranteed against defective workmanship and defective material.

See the 1912 models of the Federal one-ton trucks at all local Automobile Shows. The Federal is always **THERE—LEADING** the Procession.

FEDERAL

ONE TON TRUCK

— \$1800 —

\$1800—the Federal is the **first one-ton truck to arrive**—a year ahead of all competitors.

How can the Federal be sold for \$1800 now?

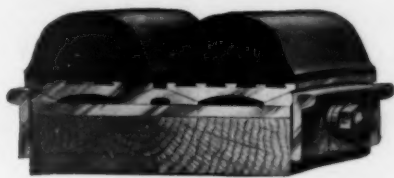
Because an enormously increased demand has brought about an enormously increased production.

Because we buy materials now in enormous quantities.

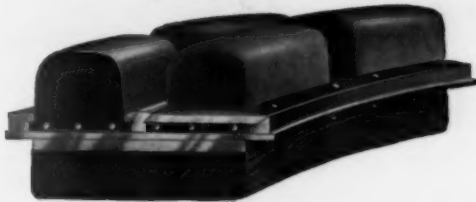
Most important of all, because we have specialized in one product; concentrated all our factory force, energy, experience, engineering skill and capacity in the one-ton Federal truck. The new price—\$1800—is the achievement of Specialization.

The Federal Model C—110 in. wheelbase, with its short turning-radius, its great power, its strong, compact body, its infallible Reliability—now dominates the field of city trucking.

FEDERAL MOTOR TRUCK CO., NEW FACTORY: Leavitt and Campbell Aves. **Detroit, Mich.**
Dept. A



Goodyear Demountable Solid Tire



Goodyear Individual Block Tire

Our Two Most Remarkable Truck Tires

Truck tires for every service—

We now make no less than six types of tires to meet the many requirements of motor truck owners.

Of the six, we regard the two pictured above as the most extraordinary.

We place them right alongside of Goodyear No-Rim-Cut Tires.

For they mean as big a saving of time and money to truck owners as No-Rim-Cut Tires do to operators of pleasure cars.

These two new motor truck tires are the "Goodyear Demountable Tire" and the "Goodyear Individual Block Tire."

Neither of these tires requires any applying device, whatever, except cold chisel, hammer and wrench.

Each is ideally adapted to medium-sized or heavy duty trucks.

Demountable Solid Tire Guaranteed 10,000 Miles

A tire with a simple and practical demountable fastening that fits the standard S. A. E. wheel and on which can be fitted the Goodyear No-Rim-Cut Pneumatic Tire.

Thus we give you the utmost in convenience—a tire which your driver can remove or replace without the least difficulty. All quickly done. No more sending wheels away or even removing them. No more trucks tied up awaiting tire changes.

And this tire gives the limit of service. The base can never wear out before the tread. For the tire base is steel to which is vulcanized hard rubber. To this hard rubber we have vulcanized a soft rubber tread. Though of three different textures, this tire can never tear apart.

In fact, a specific, ten thousand mile guaranty, countersigned by the Goodyear Tire & Rubber Co., goes with each set of Goodyear Demountables.

We furnish the "Goodyear Solid Demountable" in single or dual form.

The Goodyear Individual Block Tire

This is a tire for heavy duty service—gives greatest traction—and is non-skid.

Ours is a distinct improvement over all others.

Each block has its own, individual fastening.

Thus each block is held securely and fast—can't work loose—can't chafe underneath and wear itself

out as on block tires where one fastening attempts to hold several blocks.

The base of the Goodyear Individual Block Tire wears as long as the tread.

And when a block gets damaged—needs replacement—it is only necessary to loosen that one block. Unscrewing two nuts and lifting off the individual metal fastening does the work. Simple, quick, inexpensive. Anyone can do it—no tools required except wrench and thumb clamp.

With this tire on your truck, you need no extra tire equipment except a few blocks. You never need the services of an expert to repair your tires. Your truck is never laid up by tire trouble.

The Goodyear Individual Block tire is fully as easy-riding and much less likely to skid than the ordinary truck tire.

Two Other Tires for Heavy Trucks

The Goodyear Hard Rubber Base Tire and the Goodyear Metal Base Tire have also won fame among owners of heavy trucks. Information on these tires sent upon request.

Tires for Light Cars

For light cars we make two tires. Each possesses amazing resiliency. Each is easily applied. Each gives maximum mileage.

These are known as the "Goodyear No-Rim-Cut Solid" and the "Goodyear-Motz."

Before equipping your light car, you ought to learn all about these tires. They will save you money.

Consult Our Engineers Before You Buy Tires

Our tire experts spend their entire time solving tire problems. They are familiar with all types of motor trucks—with all duties which trucks are asked to perform—with all street and road conditions.

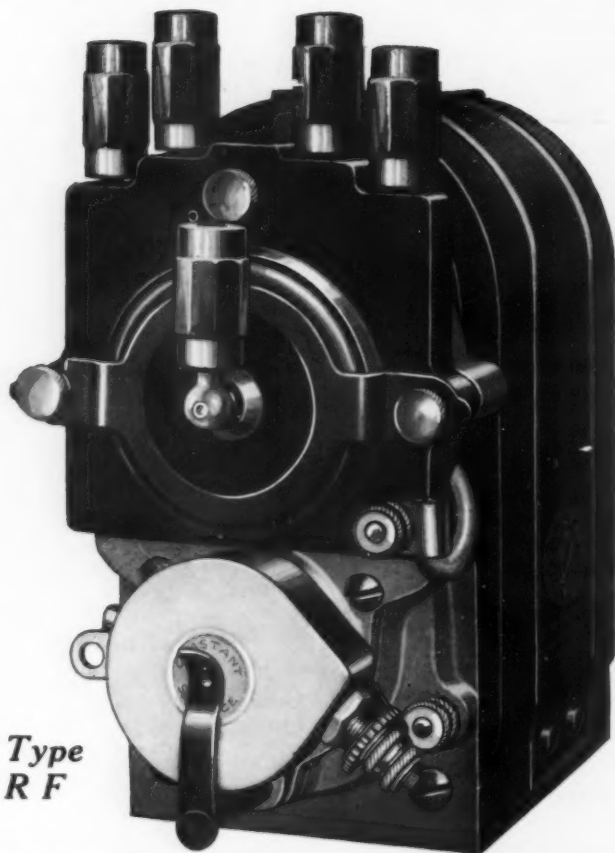
They are capable of solving the tire problems of any motor truck owner. And they are ready to do it for anybody without fee. They can tell you exactly the tire that's adapted to your truck, to your work, to your roads—the tire that will save you money, save you delays and breakdowns, protect your car from bumps and jolts—in short, they will tell you the tire you need. Simply let us know the make and model of your car; the style of wheels and rims; the kinds of roads over which your car is driven. Please write to-day to



THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO

Branches and Agencies in 103 Principal Cities. We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits
Main Canadian Office, Toronto, Ont. Canadian Factory, Bowmanville, Ont.

REMY



Type
R F

HEAVY DUTY MAGNETO

Solid tires present a grave problem to be met in the delicate mechanism of a motor car. The elimination of every delicate, intricate, or fragile part is the aim of the efficient engineer. This company begs to announce the perfection of a new magneto especially designed for trucks and tractors where solid or metal tires are used, where simplicity is a prime essential and where the highest efficiency at slow speed under heavy load is necessary.

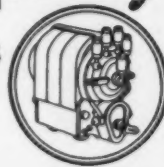
To Automobile Engineers:—Please ask us for data and full information. We are anxious that you should understand our product thoroughly.

Remy Electric Company

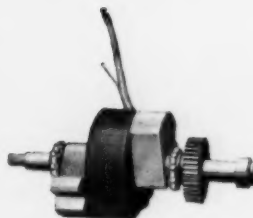
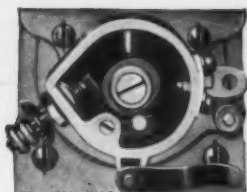
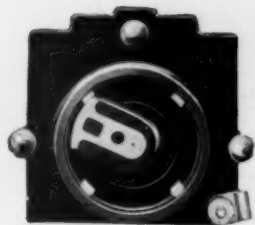


FACTORIES - ANDERSON, INDIANA - GEN'L OFFICES

BRANCHES :—New York, Boston, Detroit, Chicago, Kansas City, San Francisco, Indianapolis.



REMY



ALL THERE IS TO IT

The Inductor Type for Heavy Duty

You can certainly understand the tremendous advantage of the Inductor Type, the key to the great success of the REMY magneto. The whole effort of automobile engineering has been toward greater simplicity and greater efficiency. Here is a magneto without moving wires of any kind, without the troublesome wiping contacts, without delicate springs to weaken or break, without brushes to wear and get out of touch, without collector rings, without any of the intricate or frail devices that have made the magneto the one thing about your car you did not understand. Instead of miles of wound wire revolving in limited space causing all kinds of trouble to insulate, you have two laminated steel inductors revolving outside a stationary winding, generating the primary current which is carried direct by a wire from the winding.

It's as simple as a monkey-wrench—and just as sturdy! Its efficiency is 100 per cent without discount, and it ignites just as surely at 4 miles per hour as it does at seventy and starts on a quarter turn without batteries. It is equally efficient at full retard and full advance.

REMY SERVICE

The country-wide Remy Service is of immeasurable value to the manufacturer and his customer. A station right in his own city where all ignition difficulties can be looked after immediately by trained experts.

REMY Service Stations

Albuquerque	Minneapolis
Augusta	New Orleans
Birmingham	Nashville
Baltimore	Omaha
Canada	Los Angeles
Charlotte	Philadelphia
Cincinnati	Pittsburgh
Cleveland	Portland, Me.
Denver	Rochester
Dallas	San Antonio
El Paso	St. Louis
Houston	Syracuse
Jacksonville	Utica
Louisville	Washington,
Memphis	D. C.

Remy Electric Company



FACTORIES - ANDERSON, INDIANA - GEN'L OFFICES

BRANCHES:—New York, Boston, Detroit, Chicago, Kansas
City, San Francisco, Indianapolis



Decatur Hoosier Limited

One and One-Half Ton Truck



The above truck is in the service of the Johnson Educator Food Company, of Boston, New York and Philadelphia, operating on an average of sixty miles a day and giving perfect satisfaction.

Brief Specifications Decatur Hoosier Limited

Motor—Rutenber, 4 cylinder, 30 horsepower. **Transmission**—Selective type, three speeds forward and reverse, vanadium heat-treated gears. **Ignition**—Simms high tension fixed. **Carburetor**—Rayfield water jacketed. **Clutch**—Hele-Shaw multiple disc, running in oil. **Jack Shaft**—Full floating type; gears, chrome vanadium steel. **Springs**—2½" wide, six leaves of electric silica manganese steel, guaranteed never to take a permanent set or break during the life of the car in the hands of the original purchaser. **Axles**—Front, 2½ x 1½"; rear, 2" dead square

nickel steel. **Steering Gear**—Ross, positive back ock. **Frame**—4" channel pressed steel, trussed with five cross members. **Wheel Base**—129". **Wheels**—34", 12 spokes. **Brakes**—Three set, internal. **Tire Equipment**—Michelin demountable pneumatic, 34 x 4½", dual in the rear or any solid single or dual. **Bodies**—We make twenty-five standard bodies which we carry in stock. **Prices**—Chassis, solid dual tires, \$2400; pneumatic dual, \$2500.

A Partial List of Firms Operating Decatur Hoosier Limited Trucks on an Average of Sixty Miles a Day or Better in All Lines of Business

Best & Co., New York City; The Hartford Lunch Co., New York City; Simpson Crawford Co., New York City; Lit Bros., Philadelphia, Pa.; Blum Bros., Philadelphia; American Gas Co., Philadelphia; Henry Seigel Co., Boston; Thos. F. Galvin, Boston; Johnson Educator Food Co., Boston; Fairbanks-Morse Scale Co., Hartford, Conn.; Bay State Box Co., Boston; Tampa Gas Co., Tampa, Fla.; Centlivre Brewing Co., Fort

Wayne, Ind.; Jewett City Express, Jewett City, Conn.; The Staples Co., Schenectady, N. Y.; Clark Lumber Co., Auburn, N. Y.; Hood Rubber Co., Boston, Mass.; Merkel Bros., Cincinnati, O.; Quinn Supply Co., Chicago; American Dairy Co., Indianapolis, Ind.; Talt & Mitchell, Newton, Mass.; New England Cotton Yarn Co., New Bedford, Mass.; Norristown Gas & Oil Co., Norristown, N. J.; Bamberger & Co., Newark, N. J.

We have some open territory for live agents who are responsible financially and otherwise to handle a truck agency on the proper basis. Write for catalog and proposition

WE WILL EXHIBIT AT THE BOSTON SHOW

Decatur Motor Car Company, Manufacturers. Decatur, Indiana
 New York Chicago Philadelphia Boston

Ask the man who owns a Gear Driven Truck

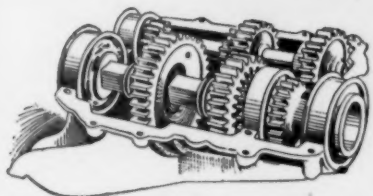
whether or not most of his trouble and repair bills cannot be attributed to

Transmission Troubles

Then you will be willing to investigate

THE LAMBERT

Friction Drive



The Complicated Gear Transmission

A Comparison is Convincing

Compare the complicated mechanism of a gear transmission with the simplicity of the Lambert Patented Friction Transmission. We are prepared to demonstrate greater efficiency with the Lambert system at a lesser operating and maintenance cost than is possible with any other type of machine. An investigation among the users of Lambert trucks will convince you of the veracity of these statements. There are two simple compartments in a Lambert transmission as compared to six complicated units in a gear driven motor truck.

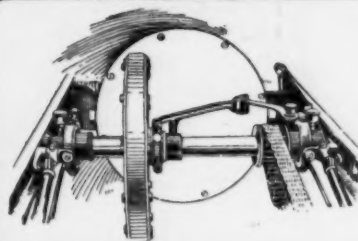
Mr. Prospective Purchaser—Surely you realize that you cannot obtain an experienced chauffeur to operate your trucks. Such men object to handling freight. With a Lambert Truck your old teamster can operate and care for the truck, because of the very nature of the construction. The profit column of your ledger demands that you investigate it.

The Lambert is the simplest and most efficient automobile manufactured. Its merits has been demonstrated thruout twelve years of manufacture. If you are interested in an automobile you should investigate this wonderful car

Your merchandise and raw materials are carried long distances by the friction of the locomotive drive wheels on the rails. Why not handle your local deliveries in a like manner with a Lambert Friction Driven Truck.

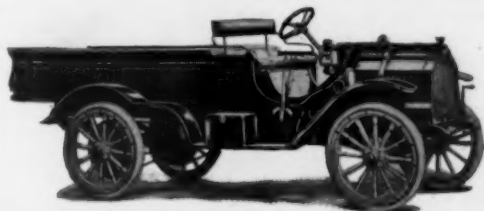
The wise Scientist many years ago said that pulling a heavy train by means

of the friction of the locomotive wheels on the rails would be a failure, but it was not



The Acme of Simplicity
The Lambert Patented Friction Transmission

Built in ½, 1 and 2 Ton Sizes with Special Bodies When Desired



One-Ton Truck, \$1800



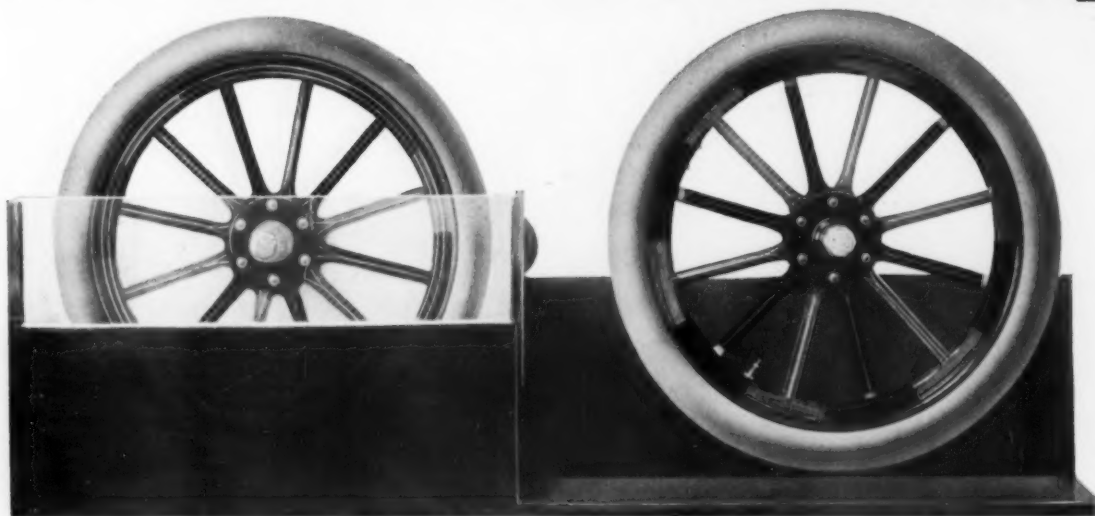
Two-Ton Truck, \$2200

Our Literature Will Interest You—Write For It.

THE BUCKEYE MANUFACTURING CO.

148 Columbus Avenue - - - Anderson, Indiana

The Varnish That Defies Soap



A startling demonstration of a Varnish absolutely unharmed by the caustic action of automobile soap—a feature of our exhibit at the automobile shows this year

Very likely you have seen the wheel revolving in the soapy water at our booth and have noted that the finish on half the spokes remained in perfect condition, while that on the remaining spokes lost its lustre before your eyes.

Six of the spokes of the wheel are finished with the best automobile gear varnishes heretofore made. They cannot withstand soap. The other six spokes are finished with

Valentine's Vanadium Chassis Finishing

These spokes stand up absolutely unharmed after weeks of exposure to soap and water.

Every automobile manufacturer, every dealer, every owner knows, after sad experience, that there has been no finish until now that has not been literally eaten up by soap. The condition of the hood, fenders and all the underparts of

every automobile, after a few months of use is testimony for all the world to see.

Valentine & Company's New Varnish

on a chassis will remain in perfect condition for months after other varnishes have been ruined. Prove this varnish for yourself.

We have prepared small pieces of tin, varnished on one side with one of the best known automobile gear varnishes and on the other side with Vanadium Chassis Finishing Varnish. If this tin is left in a strong solution of soap—say a pound to the gallon—for thirty minutes the old-fashioned gear varnish will lose its lustre. Our Vanadium Chassis Finishing will remain unharmed.

This bath in a strong soap solution is equivalent to a month or more in the garage.

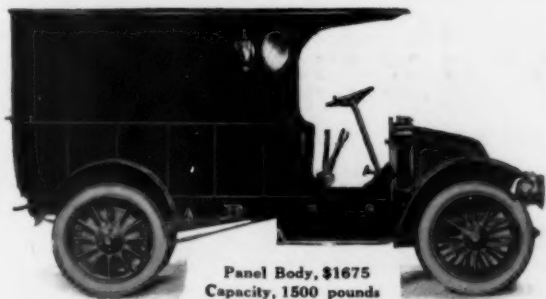
Write for this tin. Just fill out the coupon and we will send it to you at once with attractive descriptive booklets.

VALENTINE & COMPANY
456 Fourth Avenue
New York

343 So. Dearborn Street
Chicago

74 Pearl Street
Boston

Name
Address
City
State
Cut off and mail to
Valentine &
Comp'y



Panel Body, \$1675
Capacity, 1500 pounds

Don't Wait Any Longer for a Practical Delivery Car Here It Is—At a Practical Price

ARE you one of the merchants who have been waiting for the motor delivery car to be "perfected"?

Have you been looking for a sensible, well designed commercial car that would solve the delivery problem for retail merchants and others who have light hauling to do?

To all such we say: "You need wait no longer. The Lippard-Stewart Delivery Car, at \$1650 and up, meets your needs. It offers—at a low price—all you can demand in a motor delivery car."

Here is a commercial car designed and built by experienced automobile men expressly for delivery service. Not a converted touring car. Not a hurriedly built "horseless wagon." But a substantial, well-planned, scientifically constructed commercial car—with every part strong and well proportioned for the hard service a delivery car must stand.

Engineers and dealers who have examined the Lippard-Stewart cars have been unable to criticise them or suggest improvements. Merchants to whom they have been demonstrated have been quick to place orders for early delivery.

Consider these splendid features, every one thoroughly tried out and proved. Every one of recognized merit. You cannot secure these features in any other delivery car at our price. You cannot secure *all* of them in any other delivery car at *any* price. Note them carefully:

Four-Cylinder Monobloc Motor
Long stroke, slow speed, 22 h. p., five to one gear ratio in rear axle.

Selective Transmission
Vanadium steel heat-treated gears, 1-in. face.

Multiple Disc Clutch
Steel and Raybestos discs. Clutch case integral with transmission.

Special Timken Rear Axle
Full floating type; 17-inch brakes; 34-inch wheels.

Left-Hand Steering
Levers in center at driver's right hand.

Bosch Magneto Single Ignition
No batteries, timer, coil, etc.

Thermo Syphon Cooling
No water pump and connections.

Special Spring Suspension
Full elliptic in front; long semi-elliptic and auxiliary coil springs in rear.

Every Part Accessible
Each unit can be removed, if necessary, without disturbing any other unit or the load.

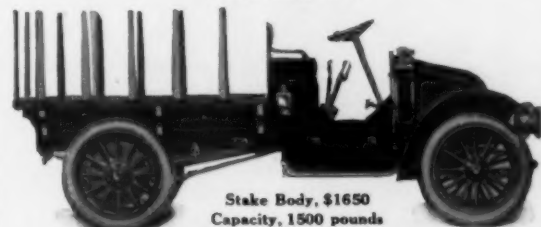
Handsome Lines—Beautiful Finish
A Lippard-Stewart car is a constant advertisement for the owner. It shows that he is progressive and up-to-date.

Motor delivery offers big opportunities to dealers and merchants alike. To the dealer, opportunities of quick and easy sales, no trading, a big market practically unlimited and so far almost untouched.

To merchants, opportunities of increased business, quicker deliveries over a wider territory, reduced delivery cost, enlarged range of profitable delivery service.

It will pay you to investigate Lippard-Stewart Delivery Cars. Write or wire for our catalog and proposition to dealers.

LIPPARD-STEWART MOTOR CAR CO.
BUFFALO, N. Y.



Stake Body, \$1650
Capacity, 1500 pounds

All Styles of Bodies to Suit All Businesses



G.V. Electrics at the Boston Show

We shall have a splendid exhibit of at least five vehicles at the Boston Show, March 13th to 20th and you will find us at spaces 122 and 123.

There will be two 2-ton Pureoxia trucks, a 5-ton Brewery truck, a 2000 lb. chassis and some light panel wagons. Don't fail to see this exhibit.



The General Vehicle Company has thousands of its vehicles in operation throughout this country, the Philippines and South America. It has age, experience, prestige behind it and its product deserves your interest and investigation.

Made in six standardized models of the following capacities:—750 lbs., 1000 lbs., 2000 lbs., 2 tons, 3½ tons and 5 tons.

Catalogue No. 84 on request

General Vehicle Company

Principal Office and Factory

Long Island City, New York

New York	Chicago	Boston	Philadelphia	St. Louis
505 Fifth Ave.	417 The Rookery	84 State St.	Witherspoon Bldg.	Wainwright Bldg.

ONE HORSE POWER *vs.* TWENTY HORSE POWER
 BLOCKS *vs.* SQUARE MILES OF TERRITORY
 HOURS *vs.* MOMENTS FOR DELIVERIES
 CENTS *vs.* DOLLARS IN PROFITS AND ECONOMIES

THESE ARE THE **BATTERIES** IN THE **COMMERCIAL CAR GAME**

This is the
Little Giant
 Commercial Car
 with platform
 and stake body.

We can furnish
 seven other
 standard types
 of body.



We specialize on
 a One-Ton Car.

The specifica-
 tions will interest
 you.

Send for them.

BET ON THE LITTLE GIANT AND YOU WILL WIN

THIS IS A STRAIGHT TIP FROM

CHICAGO PNEUMATIC TOOL COMPANY

CHICAGO

BRANCHES EVERYWHERE

NEW YORK



LALLY BODIES

Special Hoisting, Elevating and Dump Bodies

See exhibit on Packard and Velie Chassis at Boston Auto Show, March 13th to 20th, 1912.

Write for catalogue and send blue-prints for estimates.

LALLY COMMERCIAL BODY CO., 21 W. First St., Boston, Mass.

MODERN TOOLS MAKE WORK EASY

No Repair Shop or Factory is properly or completely equipped without a

CRANE PULLER



Light and convenient to use, yet it has a giant's strength. It will pull anything from a solid shaft unless actually welded together.

Will save its cost every month. Send in your order right now and save money. Catalog on request.

CRANE PULLER COMPANY
59 Brighton Avenue, Allston, Massachusetts

AUTOBESTINE

BEST BRAKE LINING
WOVEN STEEL HOSE & RUBBER CO.
TRENTON N.J.

FOR PRICES AND FULL PARTICULARS
WRITE TO THE SOLE MANUFACTURERS

WOVEN STEEL HOSE & RUBBER CO.
TRENTON, N. J.

NATIONAL SALES CORPORATION, Factory Sales Manager
250 W. 54th Street, New York
DETROIT: 874 Woodward Ave. CHICAGO: 1436 Michigan Ave.

**TRANSMISSION JACK SHAFTS
WHEEL BRAKES
BRAKE DRUMS
AND
SPROCKETS.**

**DIFFERENTIALS
AND
PLANETARY
TRANSMISSION
GEARS**

THIS IS OUTFIT NO. 358
SUITABLE FOR 1 TO 2 TON TRUCKS
20 TO 40 HORSE POWER
SAMPLE OUTFIT FOR \$140.00

WITH SLIDING GEAR TRANSMISSION
THREE SPEED FORWARD ONE REVERSE
40 QT 60 HORSE POWER
SAMPLE OUTFIT FOR \$185.00

**HEAVY BUILT
SLIDING GEAR
TRANSMISSIONS
3 SPEEDS FORWARD.
ONE REVERSE
FOR 20 TO 60
HORSE POWER. FOR
TRUCKS CARRYING
1 TO 4 TONS**

SEND 10 CTS. IN STAMPS FOR LARGE CATALOGUE

MUNCIE GEAR WORKS, MUNCIE, IND.

Motor Lauth Juergens Trucks

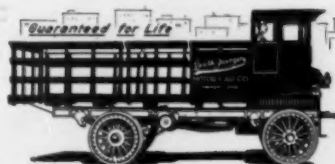
Are Guaranteed For Life

WHAT MORE CAN WE SAY?

Made in 1, 2, 3 and 5-Ton Sizes

Send for Catalogue

The Lauth-Juergens Motor Car Co.
FREMONT, OHIO



THE KINSEY MANUFACTURING CO.

TOLEDO, OHIO

Manufacturers of Auto Parts—

Kinwood Radiators, Fenders

Kinwood Oilers, Gaskets

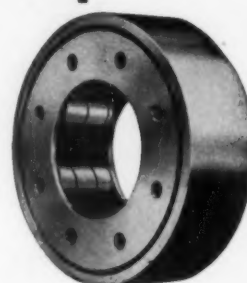
Kinwood Steel Frames, etc., etc.

SPECIAL METAL STAMPINGS

HYATT HIGH DUTY TYPE

ROLLER BEARINGS are made from an alloy steel with a very high elastic limit, making them capable of meeting severe conditions better than any other bearing.

HYATT ROLLER BEARING COMPANY
DETROIT, MICHIGAN



SCHWARZ



MANY TYPES BUT ONLY ONE GRADE!

The SCHWARZ WHEEL IS MADE TO meet every requirement of every type of every motor vehicle, and regardless of the style it is always of one quality,—the very best.

The automobile manufacturer has learned that if he wants to sell his cars without making any excuses for the wheels that he can answer every question satisfactorily in one word,—SCHWARZ!!

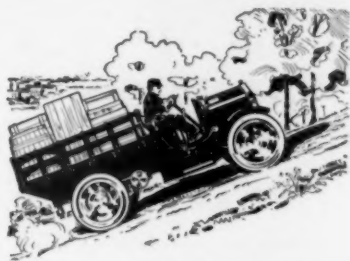
Why experiment? The reputation of the Schwarz Wheel is established. It is used on all leading Motor Trucks.

SCHWARZ WHEEL COMPANY
FRANKFORD, PHILADELPHIA, PA.

First-Class German Firm Manufacturers of Magneto Ignitors

desire to be represented in the United States of North America. Trustworthy applicants, well known among Automobile firms, please forward offers with references, under

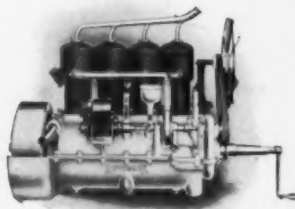
F. K. 5034 to
RUDOLF MOSSE
Karlsruhe in Baden



All Roads Are Level

to the truck that places its reliance upon

THE RUTENBER MOTOR



This is the motor that is built for service, speed and silent performance. It cuts your motor costs in half and doubles your efficiency. Write for the record of this motor and for list of power trucks carrying the RUTENBER.

The Western Motor Co., Marion, Ind.

50% of all AUTOMOBILE TROUBLE

is due to faulty DESIGN, CONSTRUCTION and operation of the CLUTCH

A SURE CURE

for this trouble is the

"EVANS" MODEL - "HELE-SHAW" CLUTCH

Multiple Disc—Pressed Steel Case

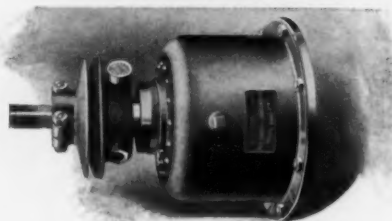
FAULTLESS

IN OPERATION, THEORY, PRACTICE

Greatest Frictional Area

Softest Pedal Control

Is more Fool Proof, Accessible, Everlasting than any other Clutch obtainable



The World's Standard—on 100,000 Automobiles

Write us fully about your problem



MERCHANT & EVANS COMPANY
PHILADELPHIA

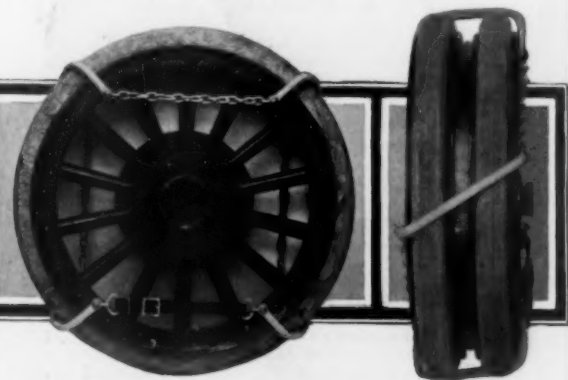
New York Chicago Brooklyn Kansas City
Baltimore Denver



GAYLOR-ATLAS

QUICK ATTACHABLE GRIPS

For solid tires offer the first real solution to the traction question for solid tired vehicles. They are efficient—harmless to tires—self-adjusting and easy to attach. Chrome Vanadium



steel, heat treated, is used in their construction, providing the durability and anti-fatigue properties required for the severe conditions under which traction grips must operate. Made for both single and dual tires.

Catalogue on request

ATLAS CHAIN CO.

Bush Terminal No. 4

BROOKLYN, N. Y.

HAYES

HEAVY TRUCK AND PLEASURE CAR WHEELS

Strongest, Most Economical and Safest Wheels Obtainable.

After years of experimenting with all sorts of wheels, the most prominent pleasure and commercial car manufacturers in the Automobile industry now specify HAYES WHEELS on their models. They have found that these wheels meet every requirement necessary in perfect wheel construction and that it is impossible to obtain a better wheel than a HAYES at any price.

A wheel that is the undivided choice of the majority of important manufacturers is worthy of your consideration.

A trial will convince you that our statements are true.

You cannot afford to use a wheel you know nothing about—the experience will prove disastrous as well as expensive.

We have been making wheels for 25 years and if you appreciate quality and a reputation for square dealing, we solicit your wheel business.

Our facilities are unequalled, enabling us to meet every requirement with little delay.

No order too small. None too large.

All orders receive our very best expert attention.

May we be favored with your wheel business for 1912?

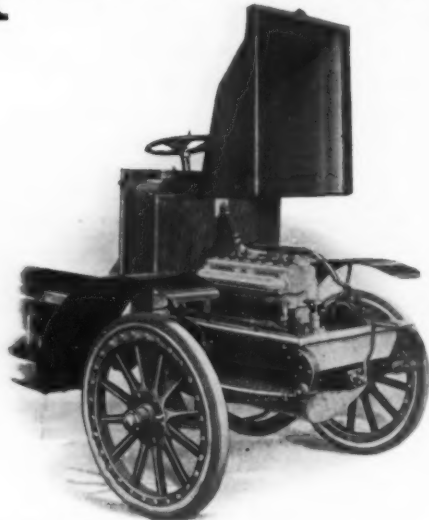
Consult us on your design. Our Engineering force is at your disposal.

Estimates and details gladly furnished on request.

HAYES WHEEL COMPANY
JACKSON, MICHIGAN

Adams Trucks

"Deliver the Goods"



The accessibility of the Adams Motor is only one of many splendid features to be found on this truck. A truck which at one bound has gained front rank in the commercial car field. We want to tell you some of the other reasons why your decision should be an Adams.

THE ADAMS BROS. COMPANY
Gen. Office and Factories FINDLAY, O.

"Reliable Springs are More important on Commercial Cars than on Pleasure Cars."



THE PERFECTION SPRING CO.
Cleveland - - - - - Ohio

SPLITDORF

MAGNETO

"Always There"

With the installation of SPLITDORF IGNITION—SPLITDORF SERVICE is at your command.

And SPLITDORF SERVICE is courteous and thorough and practical—from the factory and main distributing center in New York, through every branch office and other selling artery all over the country, to the crowning detail of personal road men.

And these road men—experts in their calling and human in their intelligence—have one duty to perform and that duty is to give their services to every SPLITDORF user for the asking.

If there is any "kink" in your ignition system—if it is not "right up to the mark" let SPLITDORF SERVICE straighten it out for you.

Your satisfaction is our satisfaction so don't be afraid to call upon us.

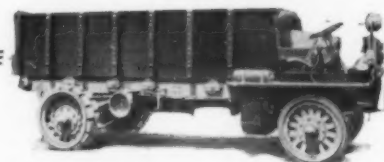
Write for catalog

C. F. SPLITDORF

Walton Ave. and 138th St.

Branch, 1679 Broadway, NEW YORK

CHICAGO BOSTON LOS ANGELES
DETROIT KANSAS CITY SAN FRANCISCO



DREADNAUGHT, Model A-6. Capacity, 6 Tons

A Pleasure Car

does not necessarily have to be a passenger carrying automobile. A commercial car that is built right and will run 365 days in the year if necessary is a pleasure car.

B-O-E

Best On Earth

is a commercial car that is designed and constructed for strenuous service. It does work like a pleasure automobile but it isn't built along these lines. Its designers appreciated that a commercial car has to do real work day in and day out. Note that practically all the weight is carried between the axles and that the construction represents maximum strength.

Made in 2, 3, 5, 6, 7 and 10 Ton sizes

For further particulars, write

MOTOR CONVEYANCE COMPANY
Milwaukee, Wisconsin

One of Many Features of **HAZARD** Unit POWER PLANTS

Electric Starting, Lighting, and Ignition System

The North East Starting and Lighting System with which we are equipping our Unit Power Plants (if desired) is entirely automatic in its operation.

It enables the driver to positively rotate the engine and start it by the simple operation of a starting switch located on the dash, and to supply current sufficient for lighting electric lamps and charge a storage battery.

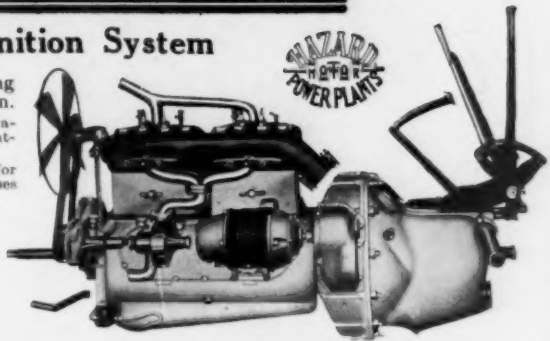
It is a Unit Auxiliary Electric Power Plant which furnishes current at all times for Starting, Lighting and Ignition. It is small, compact and light in weight. Increases weight of motor about 40 pounds.

The Lock Switch prevents tampering with car.

Other features: Motor, Clutch, Transmission and Gear Shift Control in one compact Unit. No alignment of parts necessary. Three-Point Suspension. Can be mounted in practically any car. Valves enclosed.

No Time Limit to Our Guarantee. Full Descriptive Catalog on Request.

HAZARD MOTOR MFG. CO., 843 Coates St., Rochester, N. Y.



AUTOMOBILE TUBING

Seamless Brass and Copper Tubing

of all kinds,—any size, any gauge, any temper
From 1/2" down to the finest.



We are supplying many of the largest and best automobile concerns in the country with tubing. Why not let us quote you on your requirements? Our **QUALITY** is guaranteed,—our prices are low as quality will allow, and prompt deliveries are guaranteed. Could you possibly ask for more? **Correspondence solicited.**

ROME HOLLOW WIRE & TUBE COMPANY - Rome, New York

Seamless, Cold Drawn Steel Tanks

FOR

Air, Gas, Gasoline, Oil, Etc.

High or Low Pressure

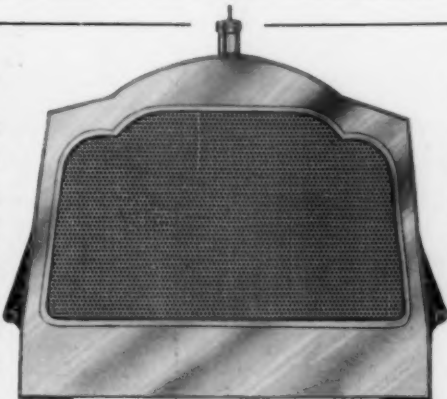
BRAKE DRUMS AND AUTO BOILER SHELLS

FEDERAL PRESSED STEEL CO., Milwaukee, Wisconsin

FEDDERS

Real Square Tube Radiators

Commercial cars require radiators that will stand many shocks and much hard usage. This was one of the weak parts of the commercial car but the test of time has proved that **FEDDERS** radiators render efficient service.



¶ We want to figure with you your requirements for the coming season. If you haven't used Fedders radiators you probably have had a great deal of radiator trouble and you may think that their isn't a radiator built that will give you satisfaction. If this is the case we would like to have an opportunity of demonstrating that the Fedders radiator will stand the wear and tear and shocks of the commercial car and that manufacturers who equip their commercial cars with the Fedders have practically no radiator trouble. We can convince you. Will you give us the opportunity?

FEDDERS MFG. WORKS
BUFFALO :: NEW YORK

COVERT

Transmissions and Jackshafts



Hard service has proven conclusively that the Covert Transmissions and Jackshafts have the staunch qualities and great efficiency demanded in truck work.

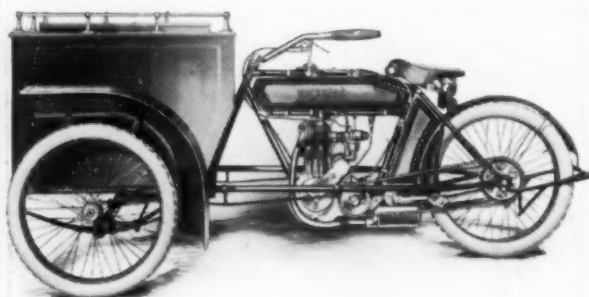
They are made for trucks ranging one-half to three tons capacity. An overload factor of 50% is guaranteed beyond any rated capacity.

Submit your transmission problems to us. Our Engineering Department is at your service.

Covert Motor Vehicle Co.

Sales Offices
Ford Bldg., Detroit, Mich.

Factory
Lockport, N. Y.



Minneapolis Light Delivery Cars

Solves Your Light Delivery Problems

Quick Reliable Efficient

Capacity 300 pounds. Three point suspension unit power plant, 5 H. P. motor, two speed transmission, multiple disc clutch and free engine. Clutch control on handle bar. Simple to operate, and built to give satisfactory service to owners at an expense of **one cent per mile**. Motor can be started while machine is standing. Handles the same as an automobile. Initial cost and upkeep small. Catalog and literature on request. Our traffic department will analyze your delivery problem for you without obligation. Correspondence solicited with dealers in unoccupied territory.

PRICE \$375

The MINNEAPOLIS MOTORCYCLE CO., Inc.
Manufacturers
517 South Seventh Street, Minneapolis, Minn.



¶ WOLF'S HEAD OIL possesses certain definite physical characteristics which prove it better suited to Automobile Cylinder Lubrication than any other oil made.

¶ If tested in comparison with other oils for viscosity, fire test, gravity, free and fixed carbon—this statement will be mathematically verified.

Wolverine Lubricants Co. of N. Y.
80 BROAD STREET, N. Y. CITY
Distributing Stations at All Convenient Points

INCREASED INCOMES

For Energetic Subscription Solicitors

Our list of automobile publications, as follows:

Automobile Trade Journal —monthly	- -	\$2.00 a year
(Covering the automobile field generally.)		
Commercial Car Journal —monthly	- -	\$2.00 " "
(Devoted to the commercial car field.)		
Chilton Automobile Directory —quarterly	-	\$2.00 " "
(Most complete classified Directory of the automobile industry.)		

Take Orders for Two publications at	- - - - -	\$3.00
" " " Three	" - - - - -	4.00

Subscriptions for more than one year at special prices.

To live men we will make a most attractive proposition.

Write for particulars and sample copies. State what experience you have had and how much time you will devote to this work.


TELL YOUR FRIENDS OF THIS OPPORTUNITY

ADDRESS:

CHILTON COMPANY

Market & 49th Sts.


Philadelphia, Pa.



As pioneers, we are able to supply any size or type for your purpose

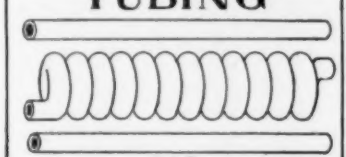
Atterbury Trucks

The trucks that deliver the goods! See them at the
Boston Show (Mechanics Bldg.), March 13th to 20th
We carry a complete and satisfactory line. Write for details.
Atterbury Motor Car Co.
BUFFALO, N. Y.



SEAMLESS

BRASS AND COPPER
TUBING



FOR
OIL AND GAS
PIPES

THE BUFFALO TUBE CO.

ERIE, PA.

Quality

Price

Delivery

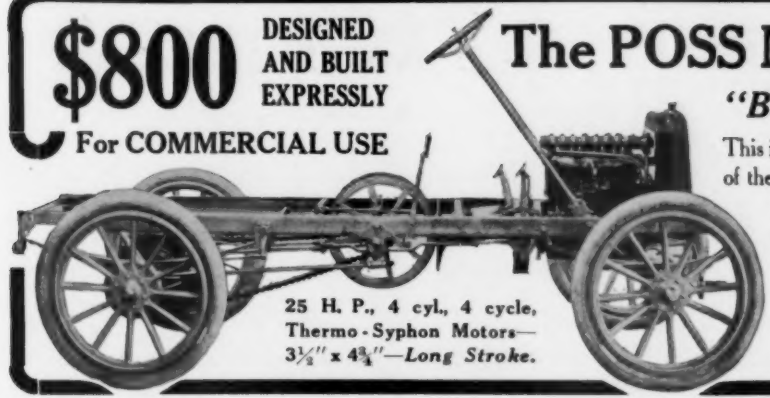
Best in the Business

\$800

DESIGNED
AND BUILT
EXPRESSLY
For COMMERCIAL USE

The POSS MOTOR WAGON

"Built for THE PURPOSE"
This is the secret of the Power, Strength and Durability of the Engine and Chassis of the Poss Motor Wagon. It is not a converted pleasure car. It has not a pleasure car engine. It has not a pleasure car transmission. It is a Power Wagon, with Power.
*Wide-Awake, Hustling Agents Wanted
Send for our Proposition To-day*
THE POSS MOTOR CO., 506 Howard Street, Detroit, Mich., U. S. A.

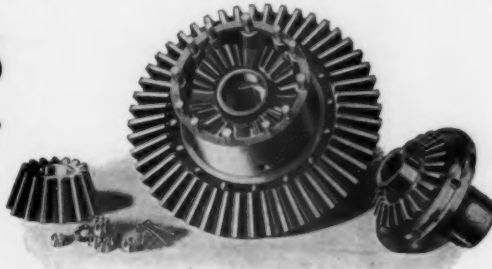


25 H. P., 4 cyl., 4 cycle,
Thermo-Syphon Motors—
3½" x 4¾"—Long Stroke.

The ROSS

Differential Gear

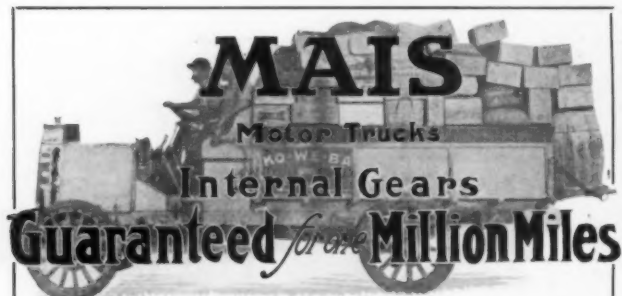
For Commercial Trucks



Made in three sizes—for trucks of from one to five tons capacity.

Write for Blue Prints

ROSS GEAR & TOOL CO. ∴ **959 Main Street, Lafayette, Ind.**



In every respect our Mais internal gear drive is superior to chains. We guarantee these gears for one million miles.

What decides the *best* truck? The record of the Mais answers—the most mileage at the lowest cost per ton-mile. All other claims are but noise that is empty compared to the sound facts that give the Mais the verdict of *best*.

Not in the gears alone, but in every feature this nickel steel Mais is the best. It is the product of international experience—it is not a "warmed over" pleasure car.

We could build chain-driven trucks, but we won't. Chains are deficient and antique. Chains lose power, sag, get dirty, break, get out of alignment, and cannot be lubricated. The best European truck builders discarded chains long ago.

We use internal gears on the Mais. They *conserve power*, are enclosed in dust and grit-proof oil-tight construction, and never need replacement.

For Catalog and data on the Mais, write

Dealers' Dept. **THE MAIS MOTOR TRUCK CO.** Indianapolis Ind.



The FEDERAL truck (carrying more than one ton of baggage) that went through the recent Glidden Tour was equipped with RED HEAD Spark Plugs.



On account of the steep Virginia and Carolina grades and Florida's heavy sand trails, the motor was worked to its capacity and it was necessary to use more oil than in ordinary service.

The fact that this FEDERAL truck finished with the pleasure cars—thanks to faultless ignition—is justification for the use of RED HEADS by the manufacturers of the Grabowsky, Federal, Autocar, Mais, Atterbury, Hewitt, Hatfield, McIntyre, Modern, and other motor trucks.

The RED HEAD is powerful enough to bear your ignition burdens and efficient enough to solve your ignition problems.

All Sizes—\$1.00—All Styles

EMIL GROSSMAN COMPANY, Manufacturer, 250 W. 54th St., New York
Western Branch and Factory, 844 Woodward Ave., Detroit

SAVE THE SPRINGS



Stops Spring Breakage and makes it possible to keep truck on the road instead of being laid up in the repair shop for the replacement of springs. **Saves Time and Expense**

Send for catalogue

GABRIEL HORN MFG. CO.
1436 East 40th St., CLEVELAND, OHIO

The Commer Truck

2½-TON 3½-TON 4½-TON 6½-TON

has a fool-proof Gear Box that we guarantee for two years. The gears are always in mesh and it is practically impossible to strip them.

A common performance for a 4½-ton Commer is six miles on one gallon of gasoline where the run is straight-ahead.

We guarantee one quart of oil will suffice for 100 miles.

Many Commer Trucks are seven years old. Many have done 200,000 miles of service. Not one Commer Truck has ever worn out.

AGENTS

can make money on such a truck. There is still some territory open.

WYCKOFF, CHURCH & PARTRIDGE, Inc.
Broadway at 56th St. :: New York City

ELECTRIC VEHICLES



Built at a Popular Price

Chassis
(including Seat)

\$1350.00

Express

\$1400.00

Panel

\$1500.00

Capacity

1000 lbs.

ECONOMY

S
I
M
P
L
I
C
I
T
Y



D
U
R
A
B
I
L
I
T
Y

Inquiries from Users and Dealers will receive prompt and personal attention

M. & P. ELECTRIC VEHICLE CO., Franklin and Dubois Sts., Detroit, Mich.

BANDS

and

FLANGES

for

MOTOR TRUCKS

PERFECT WORKMANSHIP
EXCELLENT MATERIAL
PROMPT DELIVERIES

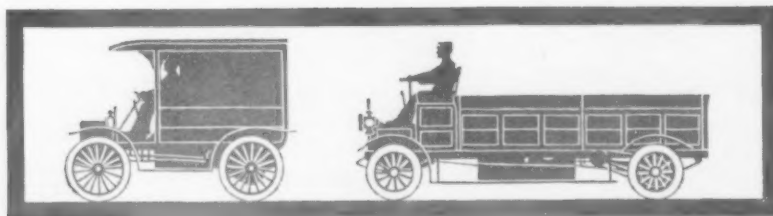
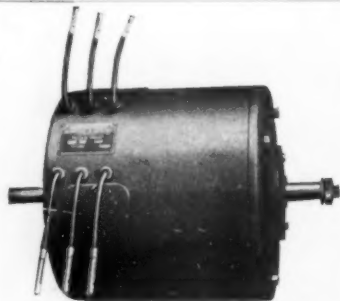
THE STANDARD WELDING COMPANY

CLEVELAND

NEW YORK

CHICAGO

DETROIT



The Economical Electric Delivery Truck Has Westinghouse Vehicle-Motor Equipments

Trucks with Westinghouse Vehicle-Motor Equipments remain in service under all conditions of loads, roads and weather. **This means economy.**

Westinghouse Vehicle-Motor Equipments give long service with low repair and maintenance charges; long life of battery; and low cost of energy. **This means economy.**

Let us show you how to equip your trucks for a minimum cost per ton mile. Our nearest office will give you detailed information.

Westinghouse Electric & Manufacturing Co.

Sales Offices in Forty-Five American Cities

East Pittsburgh, Pa.

The Free Distribution of Copies of the HANDBOOK OF 1912 MODELS COMMERCIAL CARS is rapidly exhausting the supply.

The illustrated descriptions and detailed specifications of the principal business automobiles show compactly but fully the important features of each.

The complete alphabetical list of commercial car manufacturers is also handy for easy reference.

While the supply lasts we will, on request, send a copy to any one interested in commercial cars.

COUPON D

CHILTON COMPANY, Philadelphia

I am vehicle buyer for (firm) _____
and wish the 1912 Handbook—FREE.

For hauling and delivery we now use { horses
commercial cars.

We { DO DO NOT contemplate later using Commercial Cars.

Name _____

Street _____

City _____

State _____

What some prominent concerns say about the book:

Lyman Tire & Rubber Co.—"Fills a long-felt want."

Goodyear Tire & Rubber Co.—"Highly interesting and a handy reference."

O. Fenstermacher—"Contains very valuable information and we prize it highly."

Diamond Rubber Co.—"Will certainly be used by us for material benefits."

L. V. Pike—"Contains many fine models."

Hydraulic Pressed Steel Co.



TRUCK FRAMES

$\frac{1}{2}$ TON TO 10 TON

HYDRAULIC PRESSED STEEL CO.

CLEVELAND, OHIO

R. B. McMULLEN, General Sales Agent, Chicago, Ill.



FORTY-FOUR below zero or 110° in the shade has no terrors for the Detroit Electric Commercial Vehicles, equipped with the Thomas A. Edison battery.

With the mercury standing at 44° below zero in Winnipeg, Detroit Electric Commercial Vehicles were on the streets giving their regular service, although traffic in general was at a standstill.

Think of it! The cold was so intense that even telegraph wires were snapped, but at the same time Detroit Electric Commercial Vehicles were giving equally good service in sunny Southern California.

Commercial *THE Detroit* Vehicles ELECTRIC

are designed only for the use of the Edison battery, which, in a Detroit Electric Commercial Vehicle, is 300 pounds lighter than a lead battery equipment. Still more weight is saved by the lighter construction possible throughout the entire car.

Electricity is the most economical power in existence. Its operation is cheaper, the maintenance cost, whether per ton, per mile, per package or per year, is the lowest yet obtained by any commercial vehicle.

48-page catalog, giving complete information and prices, will be sent on request.

Anderson Electric Car Company

456 Clay Avenue :: Detroit, Mich.

BRANCHES:—New York, Broadway at 80th Street.
Chicago, 2416 Michigan Avenue.

(Also branch at Evanston, Ill.)

Brooklyn Cleveland Minneapolis
Buffalo Kansas City St. Louis

Selling representatives in all leading cities.

Detroit Oilers Prevent Waste

The Detroit Mechanical Force Feed Oiler gives **sure** lubrication under every condition.

In connection with splash systems the Detroit maintains **exactly** the correct level at all times. At every changing speed the right amount of fresh, clean oil is supplied as fast as the oil is used up.

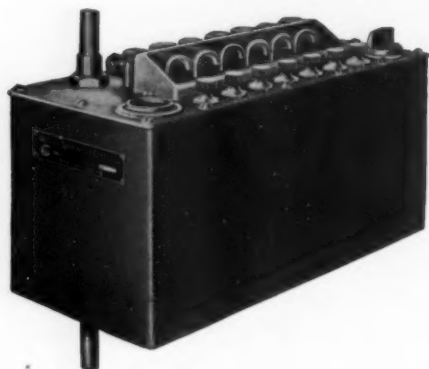
With the oil level in the crank case maintained at the proper height, there is no opportunity for either under-lubrication or over-lubrication.

By preventing over-lubrication the Detroit Mechanical Force Feed Oiler eliminates **waste** of oil and its results—carbonized cylinders, pitted valves, fouled plugs and smoke at the exhaust.

Once properly regulated the Detroit Oiler takes care of itself and needs only an occasional replenishment of the oil supply in the reservoir.

The Detroit Force Feed Oiler gives a **complete** lubricating system for **every** kind of gas engine. It is efficient, economical and sure.

The Detroit Force Feed Oiler Has No Checks



The Detroit has no ball checks or check valves, springs or other complicated mechanism to get out of order and clog up. It guards against the damage, waste and expense resulting from faulty lubrication. It makes for GUARANTEED SERVICE.

Detroit Force Feed Oilers are made in capacities from two pints to five gallons, with from one to thirty feeds—pulley, ratchet, sprocket or gear drive.

They are furnished as standard equipment by many manufacturers of high-grade commercial trucks.

The Detroit catalog tells all about the advantages in design and construction which have made the "Detroit" the standard gas engine lubricator.

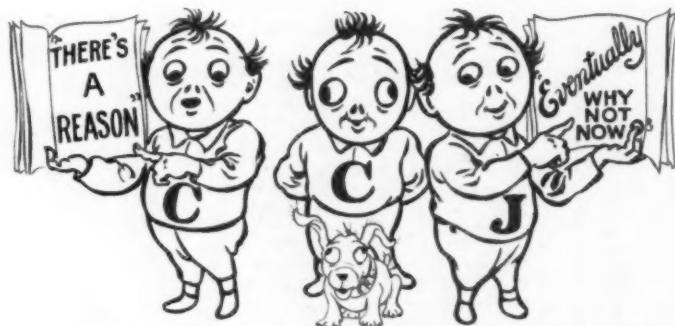
Write today for catalog P-68 and full information, stating in what kind of truck you are interested.

DETROIT LUBRICATOR COMPANY.

DETROIT, U. S. A.

Largest manufacturers of lubricating devices in the world.

VEHICLE BUYERS



THIS IS PART OF YOUR EDUCATION

Profit by the experiences of Commercial Car users. Here are excerpts from a few of the many letters we received. They are being printed in the COMMERCIAL CAR JOURNAL.

This important information will guide you in buying and using cars efficiently.

You can get it all only in the CCJ. It is yours for \$2.00 a year. Pin your remittance to your letterhead and mail it to us NOW.

UNITED CIGAR STORES CO., NEW YORK CITY.

"In figuring the cost of motor trucks against the contract for trucking we found they saved us 20%. Under no circumstances would we consider going back to horse and wagon delivery."

GARDINER DAIRY, BALTIMORE, MD.

"Each of the first four cars has done the work of four teams."

WATERBURY (CONN.) ICE CORPORATION.

"The Commercial Car is far superior to horse-drawn vehicles both in expense and quantity of work performed in a given time."

AMERICAN SILK DYEING AND FINISHING CO., HAWTHORNE, N. J.

"They are as reliable as express trains and much more reliable than express companies. To stop their use would be like stopping the telephone."

CHILTON COMPANY, Publishers Philadelphia

Service

The **sweet** element of business is **service**. It is the sunshine of business. It breeds smiles, good humor and satisfaction. Without it, everything is sour, stale and unprofitable.

It makes no difference how good your merchandise may be, if you can't deliver it when it is wanted it is of no use to anybody. It'll rot in your warehouse for all this busy world cares.

The successful business man's watchword is **"service"**. The word **"wait"** isn't in his vocabulary. He has three rules in his establishment; the first one is **"service"**; so is the second—and the third.

The motor truck is being recognized every day by the biggest business men in the country as the solution of the delivery problem of their business.

You—Mr. Business Man, have no doubt taken advantage of, and installed the up-to-date labor saving, time saving and money saving devices throughout your establishment; but you have stopped short at one of the most important departments of your business—**Your Delivery Service**.

THE DART DELIVERY CAR

is the solution of this problem: Conceded to be the greatest value for the money—of any car in its class on the market.

DEALERS!

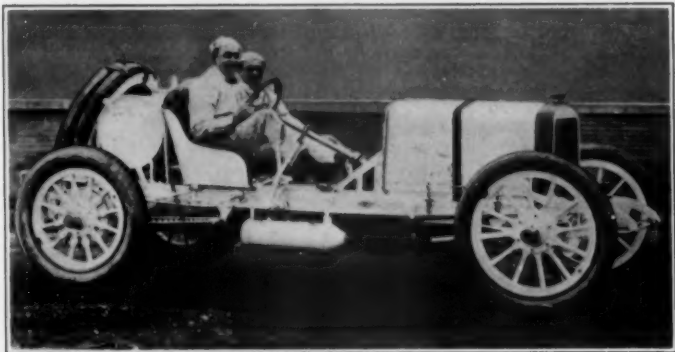
We have some good territory for the wide awake Dealer who is looking for a **MONEY MAKER**. It does not mean an investment of a mint of money. Write quick and secure your territory.

Dart Manufacturing Company, Dept. CCJ, Waterloo, Iowa

Eastern Distributors: Dart Eastern Sales Co., 1431 Spring Garden Street, Philadelphia, Pa.



Cramp's Metals Help Win The Vanderbilt Cup Race Every Year.



LOZIER CAR—Winner 1911.

Winner 1910—ALCO

Winner 1909—ALCO.

Winner 1908—LOCOMOBILE.


Parsons' White Brass in the Bearings

Bearings that give perfect satisfaction in racing cars will also give perfect satisfaction in commercial cars. The qualities of strength and durability that resist the strain and long continued high pressure of a race will enable bearings to stand up under the heavy load and continued hard service under which commercial cars work.

Write for catalogues and further particulars on bearings.

Our guarantee of quality, uniformity and fair treatment is back of every casting sold.

The Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa.



Every Motor Vehicle Engineer should have a set of our "Data Sheets" showing correct applications and mountings of HESS-BRIGHT BALL BEARINGS.

Over 70 sheets in all, with new sheets added from time to time. Sent in a neat binder, with classified Index for easy reference.

Free to engineers. Write on the stationery of your company.

THE HESS-BRIGHT MANUFACTURING COMPANY
2128 Fairmount Avenue Philadelphia, Pa.

BUCKEYE Motor Truck Jacks

Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load.

A good, strong, reliable Jack is an absolute necessity on your Motor Truck—you cannot afford to be without it—and when you need it you need it badly, and if it is the inferior kind it will prove as useless as if you were without one entirely.

Buckeyes never disappoint. They are made from Steel Drop forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity	List Price
7	11 $\frac{1}{4}$ "	6 $\frac{1}{2}$ "	18"	16 lbs.	2 $\frac{1}{2}$ tons with formed handle	\$10.00
13	14 $\frac{1}{4}$ "	7 $\frac{1}{2}$ "	20 $\frac{1}{2}$ "	26 $\frac{1}{2}$ "	3 "	15.00
14	14 $\frac{1}{4}$ "	7 $\frac{1}{2}$ "	20 $\frac{1}{2}$ "	33 "	5 "	16.00
9	11 $\frac{1}{4}$ "	6"	17 $\frac{1}{2}$ "	10 "	1 $\frac{1}{2}$ "	6.00

Our line of Motor Truck Jacks is undoubtedly the largest on the market, and suitable for all sizes of motor trucks from the lightest delivery vehicle to the largest truck made. Made from the highest grade Malleable Iron and High Carbon Steel Drop Forgings, Heat Treated, fully guaranteed.

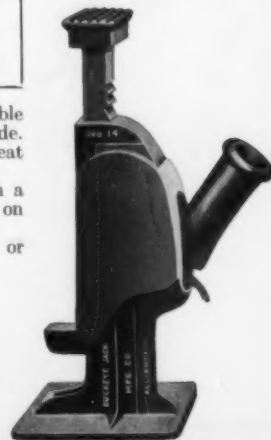
Every Buckeye from the smallest to the largest is provided with a spacious Top on the Rack, which prevents mar or injury to the paint on the car.

Buckeye Jacks are absolutely guaranteed to give satisfaction or money back.

We also carry a full line of repair parts.
Write today for descriptive catalog.

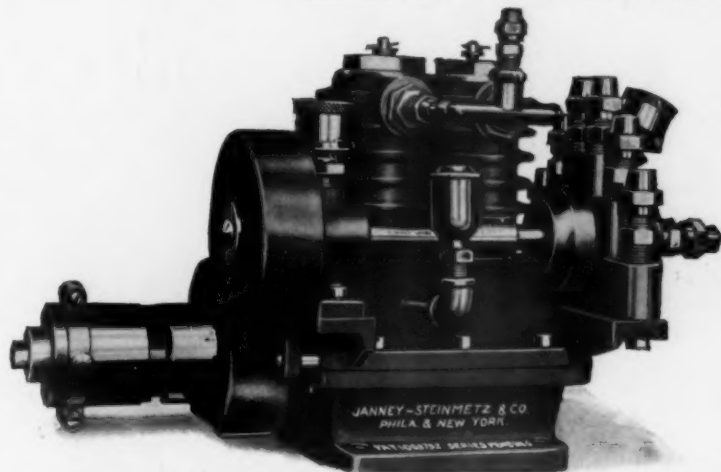
MADE ONLY BY

THE BUCKEYE JACK MFG. CO.
ALLIANCE, OHIO



CONTROLLED BY THE DRIVER FROM HIS SEAT The Janney-Steinmetz Motor Starter & Tire Inflator

Have your truck equipped with this device,—the leading truck manufacturers will equip upon request



Double Cylinder Janney-Steinmetz Motor Starter and Tire Inflator

WEIGHT 18 TO 20 LBS.

The operation of the **JANNEY-STEINMETZ MOTOR STARTER** introduces clean, compressed air into the cylinders, which is the only correct and proper method,—the only natural method of starting a motor. Light in weight, small in size, efficient and positive in its operation, it has been pronounced marvelously successful.

JUST TOUCH BUTTON ON FOOT-BOARD,—and the engine starts,—not once in a while,—but every time. To automatically inflate tires, merely attach a rubber tube to fitting provided for that purpose. Air is taken from the storage tank,—the pump need not be kept running.

PRICE, \$100

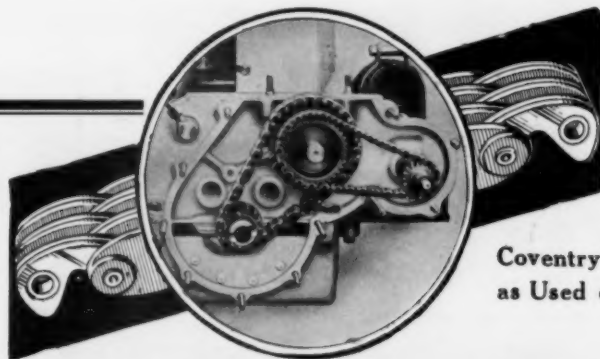
(except tank and copper tubing)

Outfit consists of double cylinder high tension Air Compressor with splash oil lubrication and gears, complete with patent "Rotor" Distributor, all special valves for air control into engine cylinders, all pipe line valves and connections, foot control valve and air pressure gauge for dash.

The demand for a real starter has been fully met by the **JANNEY-STEINMETZ MOTOR STARTER**

Write for details and descriptive circular

JANNEY, STEINMETZ & COMPANY, Philadelphia, Pa.



Coventry Noiseless Chains
as Used on "Benz" Engines

COVENTRY

NOISELESS CHAINS

Have been the standard of Europe for many years. These chains run with remarkable accuracy and precision, their construction and design make them positive and flexible.

Standard equipment on the following cars: **Daimler, Deasy, Humber, Maudslay, Benz, Arrol-Johnson, Vauxhall, etc.** Write for full description and details,

UNITED STATES REPRESENTATIVES:

SARCO ENGINEERING CO., 110 Broad St., New York

VANADIUM

The Steel of Ultimate Quality

*ELASTICITY, STRENGTH,
TOUGHNESS, ENDURANCE.*

Vanadium steel is the cheapest steel because it is the strongest, toughest, most workable and most durable. Specify it in all vital parts of your car.

Booklets and Expert Advice Free

American Vanadium Company, 323 Frick Building, Pittsburgh, Pa.

Manufacturers of Ferro Vanadium—Immediate shipment, any quantity

LONDON

PARIS

PITTSBURGH



A recent installation of JONES RECORDERS on Ebling Brewing Company's Trucks

Efficiency That Means Delivery Economy

A few of the large concerns who have recently equipped their trucks with these instruments are:—

Messrs. W. & J. Sloane

Ebling's Brewery

Lion Brewery

Peter Hauck Brewery

Messrs. A. Fink & Sons, Newark

Also Liebermann & Sons

Gimbel Bros.

The F. & M. Schaefer Brewing Co.

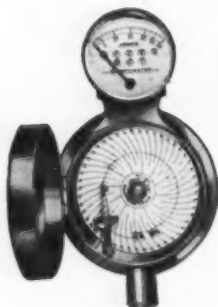
Essex County Brewery

May Manton Pattern Works

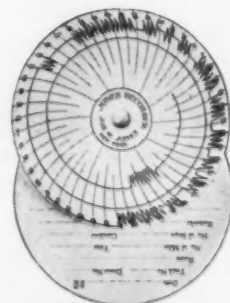
Obermeyer & Liebmann

The Pioneer Warehouses

These companies demand the greatest possible efficiency and economy in their delivery service. That is the reason why they use the Jones Recorder. We would like to have an opportunity of convincing you of the desirability of installing these Recorders on your vehicles. Write us to-day—we can save you money.



A Watchman's Time
Clock on your Truck



A Record of the Day's Work, Time,
Speed and Distance, Number of stops
and duration of each stop.

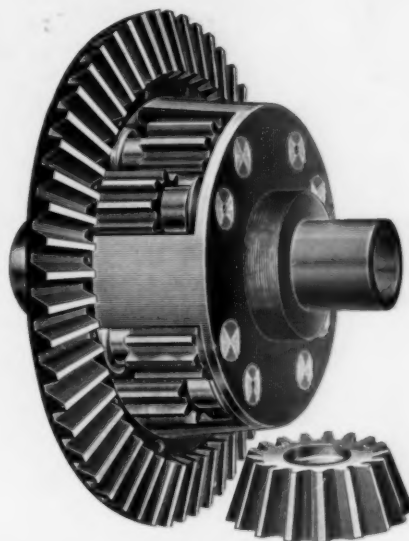
THE JONES RECORDER
Broadway & 76th Street, New York



CULLMAN SPROCKETS and Differentials

in stock and to
order.

Send for catalog
and let us quote
you on your re-
quirements.



CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE

The Diagonal Way

ENDS LONG ROAD DELAY

Motor truck owners have long felt the need of a tire that will give an increased mileage—a tire that can be easily applied and which in case of accident can be quickly and cheaply repaired.

THE DIAGONAL BLOCK TIRE

has solved these problems. Equipped with the **Diagonal** your truck will not be laid up for hours and possibly days because of tire trouble. Unnecessary to send your wheel to service station. With no tool other than a wrench a new block can be applied in less than ten minutes. **A new block makes a new tire.**



Showing block removed

**Our Guarantee—25% More
Mileage Than Any Other Make**

Agents wanted everywhere.
DIAGONAL WAY."

Write for our booklet, "THE

SEE OUR EXHIBIT AT
BOSTON SHOW, SPACE 511

THE DIAGONAL BLOCK TIRE CO.

No. 218 BEECH STREET

URBANA, OHIO

Overland

Delivery Wagon—\$900

HERE is the most practical small delivery wagon made. Just exactly what you need for quick reliable day in and day out service. Will never give you a bit of trouble. Has a capacity of 800 pounds beside seating two people. Two large full length doors in rear. It is amply, thoroughly and finely built.

Write at once for full particulars. Ask for book N-43.

SPECIFICATIONS

Wheel Base—106 inches

Tread—56 inches

Body—Two-passenger, 800 lb. capacity

Motor—4 x 4½

Horse-Power—30

Transmission—Selective, three speeds and reverse. "F & S" ball bearings

Clutch—Cone

Ignition—Dual, Splitdorf magneto and batteries

Brakes—On rear wheels, 2 inches wide, 10-inch drums, internal expanding, external contracting

Springs—1½ inches wide, semi-elliptic front, three-quarter elliptic rear

Steering Gear—Worm and worm gear adjustable, 16 inch wheel

Front Axle—Drop-forged I-section

Rear Axle—Semi-floating

Wheels—Artillery wood, 12 1½-inch spokes, 12 bolts each wheel

Tires—33 x 4-inch, quick detachable

Frame—Pressed steel

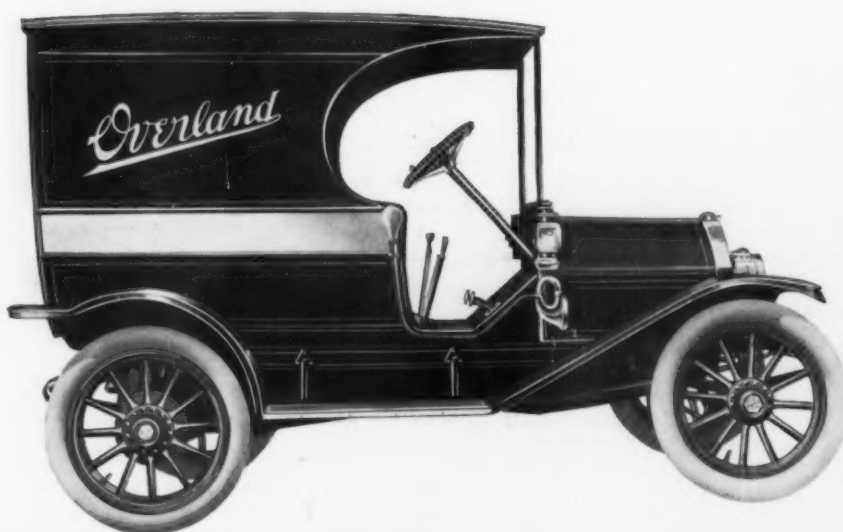
Finish—Overland blue

Price—\$900 F. O. B. Toledo, Ohio

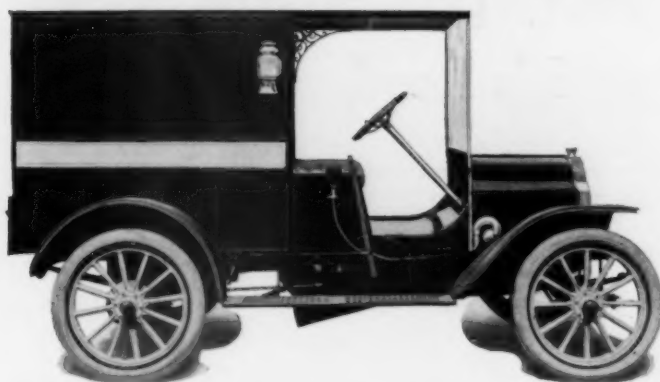
Equipment—Three oil lamps

Tools—Complete set

The Willys-Overland Company, Toledo, Ohio



Here is the 1912 Sensation of the Motor World



Panel body; Four cylinder, 20 H.P. Motor; Bosch high-tension magneto; Pneumatic tires, 32 x 3 1/4 inches, price complete, \$850; Solid 2 1/4 inch truck tires, price complete, \$800.

COMMERCE CAR

Dealers in all parts of the country are already reaping a harvest from sales of the Commerce Car.

We have some choice territory left for good, active dealers.

Do not let this great opportunity pass you by.

Read what a prominent dealer has to say about the Commerce Car and then write us for territory and dealer's proposition.

"EVERITT"

Salesroom, 2216 Postoffice, Galveston, Texas
Phone 3323

Commerce Motor Car Co., Detroit, Michigan

DISTRIBUTORS
INTER-STATE

INTER-STATE SALES COMPANY
M. O. Kopperl, Pres.

COLUMBUS ELECTRICS

Office, City National Bank,
Phone 52

December 20th, 1911

GENTLEMEN:—You will be probably interested to know of our experience with the Commerce Delivery Wagon, last night.

In unloading a carload of machines we were cut off by a line of railroad cars, and attempted to drive across the railroad track with a five-passenger touring car. It was getting rather dark and we got the front end of the car into the ditch, practically having the car standing on end. We could not see as to how to get it out, as we did not have any block or tackle or any outside assistance, when we happened to think of the Commerce.

We immediately returned to the Garage; took the little Commerce with a good big tow rope, and returned to the scene of the Battle. We first tried to pull it out with about twenty big freight hands, but could not move it an inch. We hooked the little Commerce on the end of the rope and we pulled the car, ditch and all out. We expected to find the little Commerce torn into chips this morning, but upon examination of the Commerce find the little fellow was in first-class shape, and we certainly wish to compliment you on putting out one of the most wonderful little cars that I have ever seen in my twelve years' experience in the automobile business, and trust that our future relations will be of the very best, and wishing you all success in the world, we are

Yours very truly,

INTER-STATE SALES COMPANY.

HR-F

Per (Signed) H. Endicott

The Commerce Motor Car Company

General Office, 633-639 Penobscot Bldg.
DETROIT, MICHIGAN

SHELDON

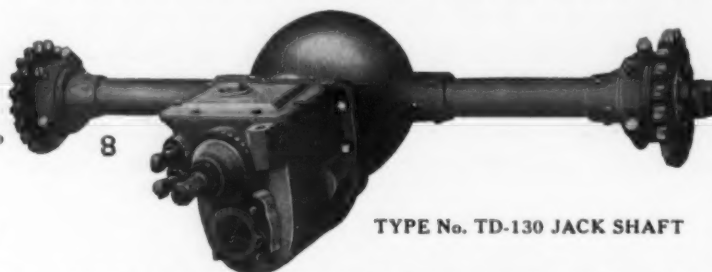
ONE TON EQUIPMENT

It's Ready For You



When we say this equipment is ready, we mean it has been thoroughly tried out, and that we are in a position to accept orders for prompt shipment.

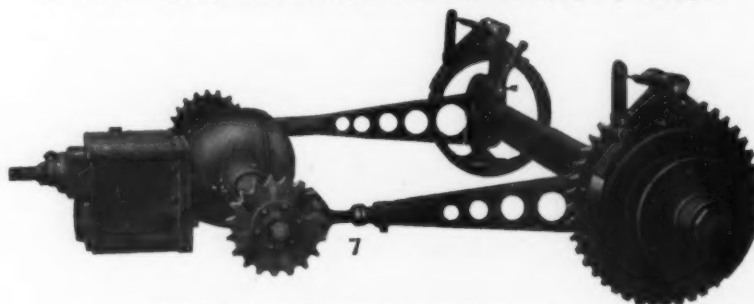
Radius
Rods
Designed to
take care
of all
operating
conditions



TYPE No. TD-130 JACK SHAFT

14 inch
Brakes,
Pressed
Steel
Drums,
with
sprockets
riveted on

A VERY COMPACT SUBSTANTIAL PROPOSITION



BRAKES AND RADIUS ROD EQUIPMENT D-132

Our One Ton Front Axle is I-Beam style with spring pads forged integral. Rear Axle also has integral spring pads.

We furnish a standard set of springs to go with this One Ton Equipment.

Order Axles, Jack Shaft, Transmission, Brakes, Radius Rods and Springs all from one source—one shipment.

Our Bulletins Give Facts Worth Getting

SHELDON AXLE COMPANY
WILKES-BARRE, PA.

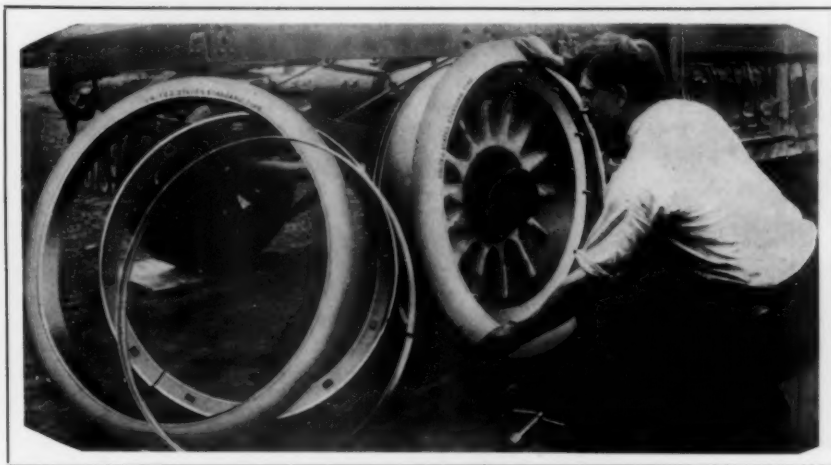
Branch Office
68 East 12th Street
CHICAGO

Branch Office
1215 Woodward Avenue
DETROIT



MORE PROFITS from your motor delivery system

is simply a question of getting more service and better service from your motor trucks—of eliminating such needless delays and losses as those occasioned by tire troubles.



A Complete Tire Change Without Removing the Wheel

Business men and motor truck experts everywhere are rapidly coming to realize the tremendous advantages to be gained by equipping their trucks with

The New UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable)

and thereby positively insuring them against the necessity of ever losing a single hour's service on account of tire troubles and tire replacements.

They are learning that this long-lived tire, with its 10,000 mile guarantee, has not only made tire replacements few and far between, but has made them a matter of a **few moments** work on the part of the driver instead of a **few days** lay-up for the truck.

The simplicity and convenience of the demountable equipment make this tire an absolutely dependable part of your motor truck, enabling your driver to make a tire change anywhere in fifteen minutes' time, a change that would heretofore have required the laying up of your truck from two days to two weeks.

With the services of each truck you operate worth from \$15 to \$25 per day, the **money-saving** possibilities of the new UNITED STATES TIRE is obvious.

If you have not yet seen our illustrated booklet, "A Revolution in Tires for American Motor Trucks," you ought to write for a copy today.

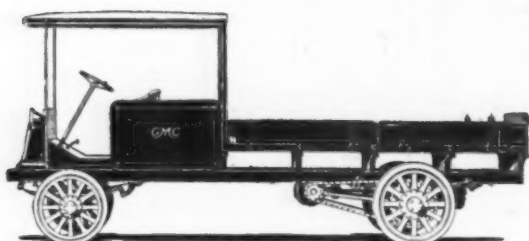
UNITED STATES TIRE COMPANY

New York

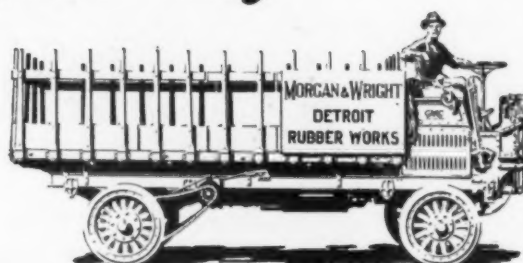
Branches, Agencies or Dealers Everywhere



Know what is back of trucks you buy



Model 6B, 3-ton Stake Electric. Price, Chassis Only, \$2300



Model H, Gasoline. Capacity $3\frac{1}{2}$ tons. Price, Chassis Only, \$3500

GMC Trucks represent not only the highest standard attained in motor transportation vehicles, but are *backed* by the financial strength, engineering resources and prestige of General Motors Company. Producing both gasoline and electric trucks in standard capacities, General Motors Truck Company meets every demand. It is in the unique position of providing expert *pre-sale* judgment without bias toward any one power or capacity and can *supply exactly what is needed* for maximum haulage at minimum cost.

Complete "Service" for Every GMC Truck

One of the great factors in the economical installation of motor transportation equipment is the maker's ability to provide efficient "service"—which really means "truck insurance."

Behind the sale of every GMC truck stands GMC "service"—assured by a distinct Service Department equipped to meet any emergency in replacement, overhauling, readjustment or other needed assistance.

General Motors Truck Company is prepared to

handle your delivery problems in a comprehensive, rather than fragmentary, way and it supplies *complete* installments of delivery trucks, both gasoline and electric, and in light and heavy capacities.

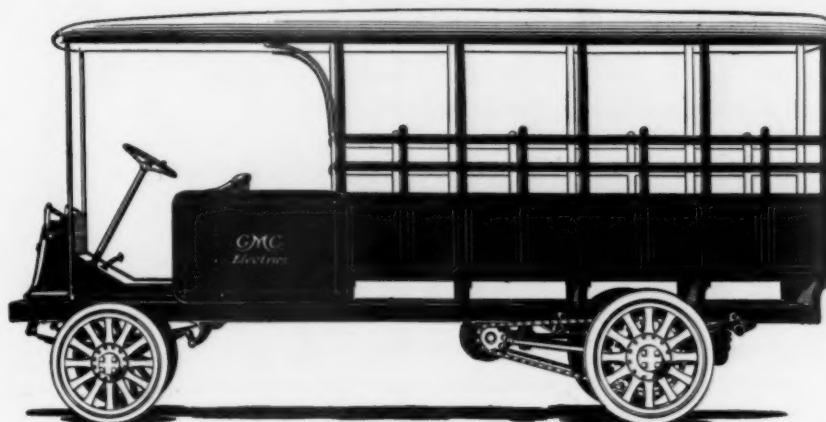
Such a standardized system of delivery *alone* makes possible maximum efficiency and economy, to say nothing of dealing with a *single* manufacturer, with a *single* centre of responsibility and "service."

GMC Gasoline and Electric Trucks will be Exhibited at the Boston Show

Correspondence from prospective purchasers and dealers is invited.

GENERAL MOTORS TRUCK COMPANY
DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit



Three Ton Chassis with Piano Box Body. Chassis Alone, \$2300.00.

The GMC Electric has eighteen distinct advantages

ONE of the greatest advances made by the American gasoline truck manufacturer was to place the motor where it was accessible. You would no more buy a gasoline truck with the engine under the body, than you would purchase any antiquated and expensive piece of apparatus.

With no established design to prevent, with no stock of parts, with no investment and special tools of plant equipment, General Motors' Electric Models are the simplest—the most efficient electric chassis ever offered, representing John Lansden's ten years of designing, production and operating experience.

This is the first time that a designer of experience has not been hampered by the cost of changes, by an existing policy or by small production.

We have placed the battery where it is most accessible, insuring longest life and lowest upkeep. The GMC Electric has eighteen distinct advantages over any other model ever before offered. Our catalog explains in detail.

No longer is the electric truck a horseless wagon with the battery, controller and motor tucked away, hidden, as it were, under the body, as though ashamed to admit their existence. But to-day the GMC Electric for the first time is an electric chassis, as such.

Each of the eight load capacities is available in three separate frame lengths, for short, medium or long bodies, depending on the special business requirement—twenty-four stock models from which to choose.

The tremendous purchasing, engineering and production facilities and financial resources of General Motors Company, the largest manufacturers of automobiles in the world, stands back of every GMC Electric Truck.

ELECTRIC DIVISION

GENERAL MOTORS TRUCK COMPANY

DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit

Announcement

A year and a half ago, we were honored by a visit from a very brilliant and progressive Naval Officer.

The many automatic machines for the manufacture of the **Edison Storage Battery**, each machine an invention in itself, interested him greatly. The new chemical and manufacturing processes he found instructive. The rigorous inspection inspired confidence, and the **great abuse** to which the **Edison Battery** can be subjected without deterioration amazed him.

"Built like a watch, but as rugged as a battleship," he characterized it.

When about to depart, he expressed the earnest wish that every man in the Army and Navy could be supplied with such information as would enable him to comprehend and thoroughly appreciate the **ruggedness** and adaptability of the **Edison Storage Battery** to Army and Navy requirements.

He considered it the most practical and useful of Mr. Edison's many inventions.

A formal catalog, sufficiently comprehensive in scope to disseminate full information concerning this **battery**, would appear too formidable, and the contents would not be assimilated as thoroughly as smaller successive installments.

We therefore contracted with the Army and Navy Journal for an entire page in fifty-two consecutive weekly issues and on October 21st, 1911, began a series of letters, addressed to the Personnel of the Army and Navy by Mr. Miller Reese Hutchison, Chief Engineer and Personal Representative of Mr. Edison.

The results have exceeded our greatest expectations. In addition to the interest evinced by Army, Navy and other Government Officers, we have found it necessary to reprint and distribute over one hundred thousand copies of these letters, in response to written requests from persons in almost every walk of life in this and many Foreign countries.

Mr. Hutchison has presented the subject in a manner which enables the layman to comprehend, at the same time providing the engineer with pertinent, authentic data.

Beginning March 1st, 1912, we are inaugurating another series of letters, addressed by Mr. Hutchison to Engineers and the General Public. They will appear weekly in many journals, and will occupy two pages in each.

Mr. Edison labored for seven years and expended over two millions of dollars in the evolution and perfection of the **Edison Storage Battery**.

The perfected type was placed on the market three and one-half years ago, since which time thousands of cells have been sold and operated in a multitude of different applications. Mr. Edison has personally studied reports of their performance, and as a result he unreservedly endorses and recommends the **Edison Storage Battery** for general use, and backs this up by a **guarantee of full rated capacity at the end of four years of use in connection with approved apparatus, irrespective of the number of charges and discharges of the batteries, and regardless of the total mileage of the vehicle on which they are installed.**

With an abiding faith in the sound business judgment and fair-mindedness of the public, knowing full well that the opposition he experienced when introducing his Incandescent Lamp would be repeated, he nevertheless attacked and mastered the problem.

The Edison Storage Battery is as great an advance in world progress as was the Edison Incandescent Lamp, and will soon come into as general use.

We hope the graphic account of the early struggles, gradual development and final accomplishment will prove of sufficient interest to merit filing for reference after reading.

Respectfully,

Approved

Thomas A. Edison

Edison Storage Battery Company

141 Lakeside Avenue, Orange, N. J.

LANSDEN ELECTRICS

with Edison Batteries

A Type and Size for Every Purpose



Delivery Wagons and Trucks of 750 Pounds to Five Tons Capacity

Operates at $\frac{1}{3}$ less average cost than the Gasolene. Will outlast any 3 gasolene trucks with one-tenth of the interruption of service. Does not require a force of experts or a machine shop to operate and maintain.

It Is Good Business

to investigate a motor truck of which the owners of more than 700 say it makes the cheapest and surest deliveries. Some have been in service seven years.

A Sure Proof That Lansden Trucks Are Best

One Express Company has over 100 Lansdens in use, purchased on 15 repeat orders. On February 1st, 1912, this same Express Company placed its 16th repeat order for 50 One, One and One-Half and Two-Ton 1912 Model Lansden Trucks,—representing a total investment of over \$500,000.00.

THE LANSDEN COMPANY, Newark, N. J.

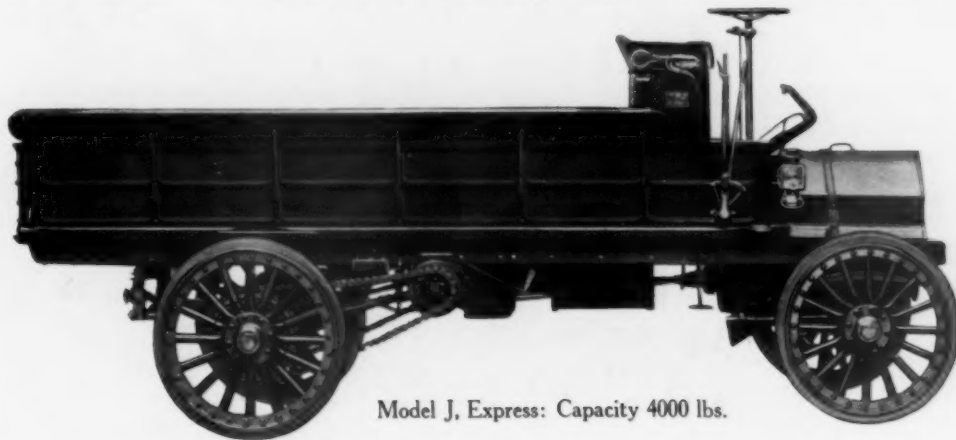
The Oldest Company Engaged Exclusively in the Manufacture of Commercial Electric Vehicles

AT THE LEADING SHOWS

Motor Trucks

THE PIVOTAL ATTRACTION

Five Models—1000 to 4000 lbs. Capacity. All Styles and Bodies



Model J, Express: Capacity 4000 lbs.

WHAT INTERESTED US:

The quality of visitors and their inquiries: Officers and purchasing agents of large corporations, buyers for department stores, hotel proprietors, storekeepers, farmers and delivery people. All wanted actual figures. We had these in plenty right from others in their own line.

WHAT INTERESTED THEM:

Chase Simplicity: New valveless, two-cycle, air-cooled motor. Entire absence of complicated parts. Ease of handling under all conditions.

Chase Efficiency: Actual daily service in city and country despite adverse conditions of roads and climate.

Chase Economy: Moderate cost of trucks. Low upkeep charges. Maximum results at minimum expense.

Chase Repeat Orders: Both in quantity and variety—our very best argument.

Chase Trucks lead the world in diversity of usage.

WRITE FOR CATALOGUE AND FULL INFORMATION

CHASE MOTOR TRUCK COMPANY

10 JEFFERSON STREET

SYRACUSE, N. Y.



LINCOLN LIGHT MOTOR WAGON

The simple construction of the **Lincoln** reduces upkeep expense.

Designed to stand the hard work and strains of delivery service.

Large carrying space, handsome design, and floor in body low enough to permit quick and easy loading and unloading.

The **Lincoln** dealer can guarantee service at the lowest cost.

The large-sized tires used on **Lincoln** motor wagons reduce tire expense. Greater tire capacity than used on many cars selling for more money, and carrying greater loads.

Lowest priced, reliable light motor wagon on the market.

\$575.00 to \$785.00

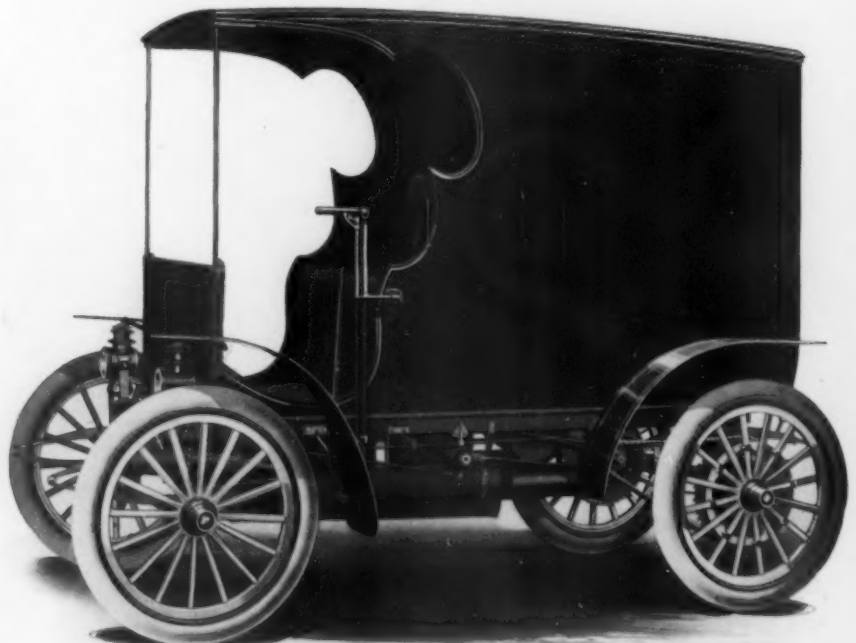
500 Pounds to 800 Pounds Capacity

Built with either open express or panel top body.

A few more agents wanted. Write for terms.

LINCOLN MOTOR CAR WORKS

**1344 W. HARRISON
STREET
CHICAGO, ILL.**



MAY WE HAVE YOUR LAYOUT OF BEARING INSTALLATION?

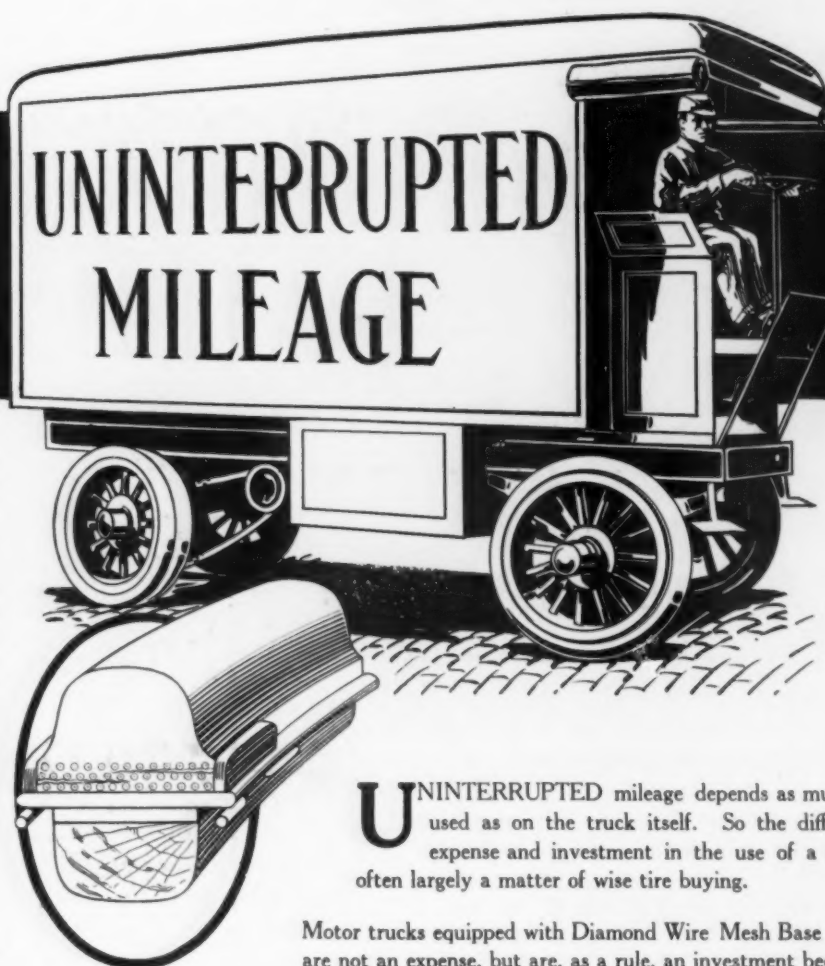
We can save you money, time and trouble,—
in other words, show you a short cut to satisfactory bearing installation.

The successful use of New Departures in 60%
of the motor cars manufactured in this country
proves that the quality of this American-made
bearing has been well established.

This fact also constitutes a good reason why
you should send us your layout and give our
engineering and sales departments an opportunity
to place our proposition squarely before you.

Our engineering department is highly specialized,
not only for the production of superior ball
bearings, but for giving to the trade expert co-operative service.

THE NEW DEPARTURE MFG.CO.
BRISTOL, CONN. 1016 FORD BLDG.,
DETROIT, MICH.



Diamond WIRE MESH BASE (SPICELESS) TIRES

UNINTERRUPTED MILEAGE

is what makes
the use of a
motor truck
profitable.

UNINTERRUPTED mileage depends as much on the tires used as on the truck itself. So the difference between expense and investment in the use of a motor truck is often largely a matter of wise tire buying.

Motor trucks equipped with Diamond Wire Mesh Base Spliceless Tires are not an expense, but are, as a rule, an investment because of insured uninterrupted mileage.

Six years of constant use has proved that Diamond Wire Mesh Base Spliceless Tires as originally designed were correct in principle. Though the truck tire industry has seen many changes there has been brought to light nothing to warrant the slightest change of principle in Diamond Wire Mesh Base Tire construction.

The thoroughness that has made Diamond Pneumatic Tires the largest selling single brand of tires in the world for fourteen years, has also made the Diamond Wire Mesh Base Spliceless Tire the largest continuously used make of solid truck tire since its correct principle was worked out by Diamond engineers.

There are 54 Diamond Service Stations equipped to take care of Truck Wheels quickly and efficiently, insuring the users of tires uninterrupted mileage.

The Diamond Rubber Company

Akron, Ohio



MACK



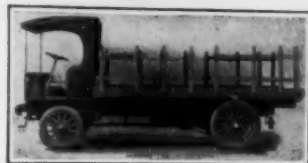
COMMER



SAURER



POLACK MOTOR TRUCK TYRES



GARFORD



SAURER



GENERAL VEHICLE

Try Polack Tyres on your Electrics and note the saving in current consumption.



PIERCE-ARROW

Will prove conclusively by a few frank comparisons that they are incomparably the cheapest in use; the most resilient; the tyres which give the greatest amount of effective service under all conditions of usage.

Send for booklet and latest price lists.

POLACK TYRE COMPANY

Main Offices:

Ehret Bldg., Broadway and 59th St.
New York City

BRANCHES:

146 Summer St., Boston, Mass.
1004 Michigan Ave., Chicago, Ill.
247 Jefferson Ave., Detroit, Mich.
512 Mission St., San Francisco, Cal.
516 Parkway Building, Philadelphia, Pa.
505 Liberty Ave., Pittsburgh, Pa.
917 First Ave., So. Minneapolis, Minn.
930 South Main St., Los Angeles, Cal.



ALCO



PACKARD

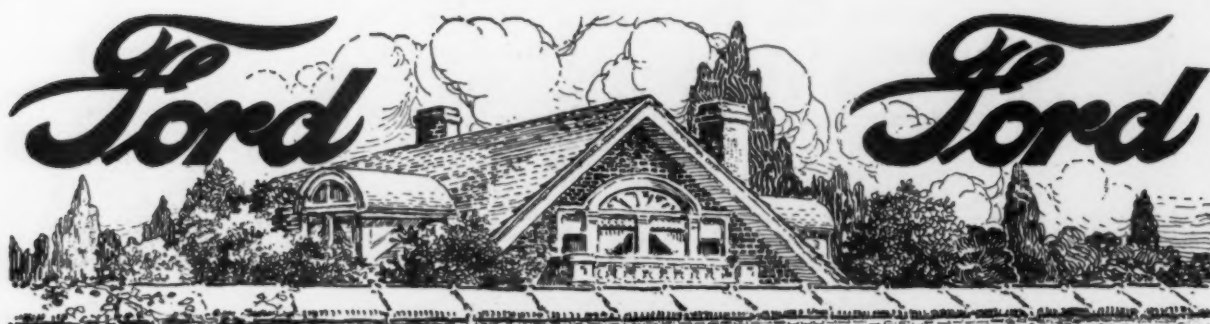


GRAMM

Try Polack Tyres on your Gasoline Trucks and note the saving in repairs.



COMMER



It opens up a
closed territory

Model T Delivery Car



\$700

The Barriers Are Down for all the many lines of business that have been looking for a light, flexible, tough, low-priced, high-quality delivery car. Not a truck nor a van, but a **CAR**—that can cover the ground, open up new territory, bring in new customers, advertise its owner, extend the business, outwork a team of horses and cut the maintenance bill. That car is this **FORD Model T Delivery**.

This price includes full equipment—Automatic Brass Windshield, Speedometer, Ford Magneto built into the motor, two six-inch Gas Lamps and Generator, three Oil Lamps, Horn and Tools. No Ford cars sold unequipped.

Capacity, 750 pounds of Merchandise.

THERE IS NO CLOSED TERRITORY to the wholesaler, the retailer, the power or light company that uses the Ford Model T Delivery Car. It eats up space and annihilates time. It makes relics of more than a million old style delivery vehicles in the United States. It is the feature of 1912 in commercial automobiles. It advertises its dealers and booms its buyers.

TWO YEARS OF HARD PRACTICAL TEST lie behind this statement of fact. The Wanamaker stores of New York and Philadelphia, and the Bell Telephone Company all over the Country, have taken these Ford Model T Delivery cars and driven them now for over two years, winter and summer, uphill and down. No factory test here, but the actual grind of work. Result—not a change. The **guarantee of Accomplishment** stands on this car.

Light: weighs 1200 pounds—low tire expense—less fuel, multiplies the actual horsepower—carries 750 pounds of merchandise—carries it anywhere, any time.

Flexible: turns in a circle of 28 feet—accommodates itself to owner's and customers' space.

Tough: the same strong chassis of all Ford Model T Cars—same simplicity of operation, same Ford magneto built into the motor, same Vanadium steel throughout (40 locomotives of vanadium at twice the cost of carbon steel are now being considered by the Secretary of War for use at Panama).

Low-Priced: completely equipped—\$700—no more than a team and wagon.

High-quality: stands side by side with the other productions of Ford genius—with more than 100,000 drivers vouching for them.

Your competition is active. Think hardest and FIRST. Send for our descriptive booklet. Ford branches and dealers everywhere. Good dealers in unoccupied territory are requested to write us.

Ford Motor Company

Detroit, Michigan, U. S. A.



THE PIERCE-ARROW worm gear drive will outwear several sets of chains and sprockets—and this guarantee is behind it:

GUARANTEE

The worm wheel and worm shaft, generally known as worm gear construction, employed in the Pierce-Arrow Truck, are warranted to fulfill their functions for one year from date of shipment, under normal service.

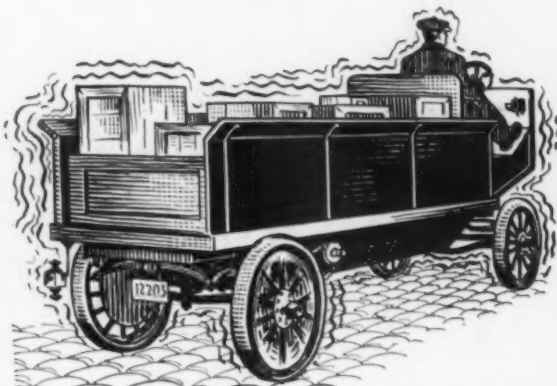
Worm gear drive conserves much of the power lost in transmission by other means.

PIERCE-ARROW

5-TON MOTOR TRUCKS

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.

Why Ruin Your Light Delivery Car?



It is no longer necessary to expose your light delivery car to the violent shocks of rough roads which will quickly rack and ruin it. While these jolts and bumps cannot be avoided, they *can* be *absorbed* and the car protected by the use of *Motz Cushion Tires*.

Motz Cushion Tires on your light delivery car will not only give you longer service than solid tires, but will make

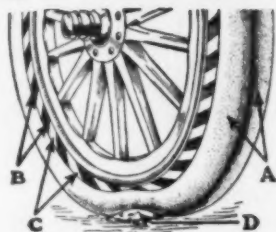
your car ride as easily as if equipped with properly inflated pneumatic tires.

All leading makers of Electric Pleasure Cars now equip with Motz Cushion Tires in preference to solid or pneumatic tires. They realize that even on the most delicately constructed automobile, the Motz Cushion Tire gives full resiliency.

MOTZ CUSHION TIRES

For Light Delivery Cars

This pneumatic resiliency is obtained by three ingenious features — *double treads, undercut sides, slantwise bridges*. These features are protected by exclusive patents which we own. And observe, too, that the Motz Cushion Tire is *quick-detachable*.



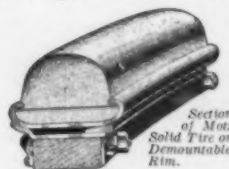
A—Shows double treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

It fits any standard clincher, universal quick-detachable or demountable rim and can, therefore, be replaced without removing the wheel. This means that your truck is never out of commission through tire trouble and that it is giving you full service at all times.

MOTZ Solid Tires for Heavy Duty Trucks

For heavy duty trucks—where load, not speed, is a factor—we recommend Motz *Solid Tires* on demountable rims. They possess the same quick-detachable feature as the Motz *Cushion Tire* and give the utmost in length of service. *May we*

tell you what owners of commercial cars using Motz Tires have learned of their efficiency and desirability?



Section of Motz Solid Tire on Demountable Rim.

Simply send your name on a postal for booklet 85.

SEE OUR EXHIBIT AT THE BOSTON SHOW, F 535 and 536

THE MOTZ TIRE AND RUBBER COMPANY

Factories and Executive Offices, AKRON, OHIO

BRANCHES: 1737 Broadway, New York; 2023 Michigan Ave., Chicago; 999 Woodward Ave., Detroit; 409 E. 15th St., Kansas City

(183)

*For every man who can paint
a masterpiece there are thousands
who can copy it — but
the copies never equal
the original*

J. L. G. & Bro. 3/1/12



Gibney Single

GIBNEY

The Three-Years-Ahead Tire



Gibney Dual

NEARLY all tire manufacturers are now claiming great things for that type of tire which we introduced three years ago. That is why the Gibney Tire is known as the "Three-years-ahead" tire; and that is why it pays both manufacturers and consumers to use Gibney Tires. There is just enough difference to assure the buyer greater value. It's to your interest to safeguard your tire investment by avoiding experiments.

Note what a user of GIBNEY TIRES has to say about GIBNEY service:

Extract from letter dated Nov. 11, 1911:

" We have been using your tires since 1904 and our experience in every way has been satisfactory, particularly with your new type of tires. . . . We also wish to add that our relations with you during these years have been most agreeable, and we have found you ready to correct any errors or make any adjustments when necessary."

(Signed)

C. SCHMIDT & SONS
BREWING CO.,
Philadelphia.

BUYING MILES

WE have practically but one thing to sell you, and that is mileage. It matters not whether a tire is round, square, smooth or rough. The thing that concerns you most is the number of miles it will give before it wears out. Our object is to build practically an everlasting tire. That we have been more successful than others is demonstrated by the letters we receive from users, which show that in comparison the Gibney Tire gives the greatest service.

May we give you quotations? State quantity and size required.

JAMES L. GIBNEY & BRO.

217 N. Broad Street, Philadelphia

248-52 W. 54th Street, New York



MERCURY MODEL P-2

Canvas Panel Body

\$850 F. O. B. Chicago, \$850



MERCURY MODEL P-1

Open Express

\$750 F. O. B. Chicago, \$750



MERCURY MODEL P-4

Fore Door, Wood Panel

\$900 F. O. B. Chicago, \$900

Carrying Capacity All Mercury Models, 1000 pounds.
Prices include Lamps, Horn and Tool Equipment.

MERCURY TRUCKS

THE FOREMOST LIGHT DELIVERY
CARS ON THE AMERICAN MARKET

During the past four months more than 50 per cent of our sales have been on **repeat orders**, received from merchants who previously ordered one or more cars to try out, and later came back for additional cars.

SPECIFICATIONS

Wheels—36 in. front, 40 in. rear.

Tires—12, solid rubber.

Motor—Two-cylinder, opposed, 14 H. P. Air Cooled Mercury.

Control—Single lever control for all speeds—high, low and reverse.

Drive—Shaft to jack shaft, double chain from jack shaft to rear wheels.

Carrying Capacity—1,000 pounds.

Cost no more to maintain than a horse and wagon.

Solid rubber tires insure owners against expense and delays, caused by punctures and blowouts.

No water to freeze, no leaky radiators.

Always ready to go, serviceable the year round, summer or winter, regardless of weather or road conditions.

WRITE FOR CATALOGUE

The Mercury Manufacturing Co.
4106 So. Halsted Street, Chicago, U. S. A.

The Largest Exclusive Manufacturers of Light
Delivery Trucks in the World

Eastern Representatives

JAS. R. ASHLEY
527 Fifth Ave., New York

MARION MOTOR CAR CO.
1281 Bedford Avenue, Brooklyn, N. Y.

FRANCO AUTO TRUCK CO.
4618 Regent Street, Philadelphia, Pa.